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DIESEL RAILWAY TRACTION

The February issue of this RAILWAY GAZETTE *publication, illustrating and describing developments in Diesel Railway Traction, will be ready on February* 1, *price* 2s.

Railway and Road Efficiency

ONE of the primary objectives of the British Transport Commission is recognised as being the integration of railway and road transport. If and when that is achieved, many of the major problems which bear so heavily at the present time on the administrators of the nationalised transport systems of this country, will be resolved. So far, relatively little progress has been made in this direction in the two years which have elapsed since the passing of the Transport Act, 1947. There is a good reason for this; the railways passed to the British Transport Commission with a minimum of disturbance and it was possible to carry on their day-to-day services and administration without any change being apparent to the public. In the case of the road haulage and road passenger industries, that was not so. The road hauliers are still in process of being acquired and a separate method of approach has been evolved for dealing with much of the road passenger industry. In *The Financial Times* of January 23 and 24 an article was published in two parts, headed "Are British Railways Efficient?" and a good deal of space was devoted to comparisons between the relative productivity of road and rail, and of the differences between the two main units of the British transport system. Despite an admitted lack of satisfactory data dealing with road traffic, it was suggested that there was *prima facie* evidence of unequal efficiency between rail and road and it was argued that on the bases of both productivity and financial burden, the railways were at a disadvantage. The conclusion was reached that although eventually the economies of unified transport may be so great that road charges can bear an additional burden, as a contribution towards meeting the annual interest on railway permanent way and works, the immediate outlook is that when the charges schemes are introduced, overall road rates will rise. It is also suggested in the article that objections to suspending any increases in charges for a year or so, while transport economies are pursued, are based on political rather than financial considerations.

Conservative Policy on Nationalisation

THE General Election manifesto of the Conservative Party deals at some length with the effects on British industry of State control. It condemns State monopolies created by nationalisation as "rigid, awkward, wasteful and inefficient." It therefore declares that, if elected, it will bring nationalisation to a full stop. It would repeal the Iron & Steel Act before it could come into force, and the nationalisation of buses and tramways would be halted. It would be prepared to sell back to free enterprise those sections of the road haulage industry which have been nationalised, to restore the former system of "A" and "B" licences, progressively eliminate the limitation of distance on private road hauliers and leave untouched the present freedom of "C" licences. British Railways, it proposes, should be re-organised into a number of regional railway systems, each with its own pride of identity and each administered by its own board of direction, the members of which would have varied practical experience of serving public needs. The coal industry would be drastically re-organised by restricting the duties of the National Board and by giving autonomy to the Area Boards.

Railway Wage Claim Rejected

LAST week, we referred briefly to th econference held in London on January 12 to discuss the wages policy of the T.U.C., when a majority for the policy was secured by quite a small margin, thus weakening still further its chances of success. Since then the National Joint Council for the Building Industry has announced an increase of 1s. 10d. a week in the standard rates of pay under a sliding scale agreement and other industries also are due for increases under this system. The implementation of these increases again points to the failure of the policy encouraged by the General Council of the T.U.C. and is more than likely to influence those unions without sliding scale agreements based on the cost of living which are pressing for higher rates of pay. Railway workers are once more in the front of the picture. Last week, the claim by the N.U.R. for a minimum wage of £5 a week was considered by the Docks & Inland Waterways Executive and the Hotels Executive and turned down, while on Tuesday last the claim was discussed at a meeting of the Railways Staff Conference. The corresponding claim by London Transport workers was considered on January 25.

Bankers' Views on the Economic Position

DURING the past week leading British bankers have given their views on the economic position of the country as a whole and all are in agreement that one of the most effective means of providing the necessary stimulus to industry in general would be a reduction in the burden of taxation which at the present time is stifling the spirit of incentive that needs to be fostered at all levels. Anxiety is expressed at the rate of Government spending, and the Chairman of Barclays Bank, Sir William Goodenough, considers that the present rate of expenditure in

relation to the national income is one of the prime obstacles to recovery, being directly conducive to inflation and constituting a serious threat to the whole future of the country. Mr. Evan Smith, Chairman of the National Provincial, points to the fact that an income tax which transfers nearly half the profits of trade and industry to the State is an intolerable burden which has to all intents and purposes extinguished creation of capital by the individual. Though basic industries in private hands had continued to produce satisfactory results, nationalised industry, alternatively adulated and exhorted, had not yet reached the promised efficiency and harmony, and was best left unsung.

Railway Rolling Stock Exports

EXPORTS of railway locomotives, wagons, carriages and parts during 1949 totalled some £24,542,179, according to the recently issued *Trade & Navigation Accounts*. This was a considerable improvement on the previous year, when the total value of these exports was £17,987,039. Of the total, locomotives were responsible for £8,240,976 compared with £6,599,269 in 1948. The most valuable market last year was the Union of South Africa, which took £2,288,276 worth of locomotives. Parts, except axles, tyres, wheels, etc., and contractors' light locomotives were shipped to the value of £3,341,986 compared to £2,485,330 in the previous year. Rail motor vehicles, and carriages and parts, except axles, tyres, and wheels, and wagons sent overseas, reached a value of £7,956,251, which compared with £4,880,361 in 1948. Axles, tyres and wheels for locomotives, carriages and wagons came out at £5,002,966 against £4,022,079.

"Operation Phœnix" on the Victorian Railways

WITHIN the next ten years or so, the Victorian Railways propose to spend £80,000,000 on "Operation Phœnix," the name which has been given to their post-war recovery scheme. The object is to restore efficiency lost through lack of money over a long period, heavy wear and tear of rolling stock, especially during the war, and shortage of labour and materials since the war. Mr. John Elliot, Chief Regional Officer, Southern Region, British Railways, in his report to the Victorian Government on transport in the State, said of the plans that they "are sound and sufficiently far-reaching to serve the main purposes for which they have been designed. Already, much has been accomplished. The first units of thirty diesel railcars are in service, the improvement of the Gippsland line is in progress, and new works are in hand in the Melbourne suburban area. Large contracts have been let for rolling stock, in Australia and elsewhere, and the railway workshops at Newport will also build locomotives and coaches. The programme also includes an underground railway at Melbourne, new stations, widenings and electrification, and modernisation of depots.

Signal Arm Proving

SOME idea of the extent to which electrical apparatus has been added to ordinary mechanical signalling installations in an endeavour to raise their standard of safety was given in a recent discussion at the Institution of Railway Signal Engineers, introduced by Mr. F. W. Young. At one time, the only electrical equipment in our mechanical signal boxes apart from the telephone, single-needle, or other communicating instruments, was the block telegraph and the signal arm and light repeaters, and one large pre-grouping railway long had none of the last mentioned. The signalman was provided with an indication of the condition of a signal arm and was expected to look at it every time he worked the corresponding lever. Then gradually it was thought desirable to prove the distant signal arm "on" when accepting a train, and what was called "interlinking" was installed on a considerable scale on some routes, while electric locking of the signal at the entrance to a section, proving of outer homes by the block and then of other signals as those in rear of them were cleared, were adopted.

An Inexperienced Signalman

COLONEL R. J. WALKER'S report on the derailment which occurred at the Douglas Park signal box, Scottish Region, on May 26, 1949, summary of which appears in this issue, shows that, for some reason which the signalman could not be persuaded to divulge, the signals were put back to danger after the approaching express had passed the distant at clear. An attempt was made to reverse the facing points for a refuge line just as the engine reached them, with the result that it dropped between the stock rails. Smoke and steam had obscured the home signal until the train was about 100 yd. from it, but the driver, who could see there was no ordinary obstruction on the line, was pulling up rapidly and the accident fortunately had no serious consequences. The points were put back to normal between the bogies of the first vehicle and partially re-bolted. Blame is, of course, placed on the signalman, and Colonel Walker recommends a reversion to the earlier practice of obtaining references as to character when engaging men for training for this class of work, where reliability is of the highest importance.

Detecting Rail-Joint Defects

AN important step in the detection of rail defects *in situ* has been taken in the recent development of the Sperry ultrasonic method which functions somewhat on the same principle as that used in detecting flaws in locomotive axles and crank-pins. Two types of equipment have been designed, one a light type of car which can be pushed along by hand and lifted from the rail, and the other a semi-automatic unit mounted on a diminutive rail motorcar. With the latter, the testing equipment is mounted on a pivoted carriage at the rear, so that it may be swung readily from one rail to the other. This new form of detection is designed to locate rail defects at the joints without removal of the fishplates. Such defects are bolt-hole cracks, head-and-web or foot-and-web separations, and split webs, and, except for the last named, are most likely to develop where sleeper packing is inadequate and there is vertical movement of the joint under traffic. For this reason the ultrasonic testing should be of special value in tunnel rail inspection. Defects are located by the transmission of pulsed ultrasonic vibrations from a searching unit, supplied with current by a portable a.c. generator, directed into the head of the rail.

Traditional Names for Locomotives

LOCOMOTIVES have carried names since the earliest days of the railway, and in its decision to continue locomotive naming, the Railway Executive recognised the popularity of the practice with large sections of the public and railway staff. A recent allocation of names covers 68 express passenger locomotives of pre-nationalisation types, all of which have been built, or are included in current building programmes. Many of the names chosen continue the type of name associated with pre-grouping railway systems, or locomotive works, and a number of the "A1" Pacifies, which are built at Doncaster and Darlington, will receive such names as *H. A. Ivatt, Patrick Stirling, Sir Vincent Raven, Great Central, Great Eastern, North Eastern,* and *North British.* As some of these locomotives work in the Scottish Region, 19 are to carry names of Scottish cities and their patron saints, as well as of characters from the works of Sir Walter Scott. In the Western Region traditional names will be continued with ten "Castle" and ten "Manor" class 4-6-0 locomotives.

First Stage of the Paris-Lyons Electrification

NOW that it has a footing on the Paris-Lyons main line of the former P.L.M. Railway, electric traction will be open to comparisons with the performances of the long and noteworthy series of P.L.M. Pacifics. Just as these locomotives were evolved by the progressive application to a sound fundamental design of the latest developments in steam traction technique, so have the new electric machines for this route been derived from well-tried forerunners by embodying recent improve-

ments. This aspect of the scheme was dealt with in our July 15, 1949, issue, and on other pages this week we describe the fixed installations and civil engineering work involved in this important main-line conversion. Electric trains are running already between Laroche and Dijon, and in due course will be extended to Paris. Later, the section from Dijon to Lyons and Chasse will be completed, where good progress had been achieved before material shortages made it necessary to concentrate on finishing the northern end of the line. The 52 substations serving the whole route will be in three groups, with remote supervisory control from offices at Paris, Dijon, and Lyons respectively. Only two pairs of wires will be used for controlling all the substations within a group, for these will be connected in a form of omnibus circuit, and the code signals to and from each will be sent on different frequencies. The economies possible by concentration of control are a new factor to be considered in assessing the fixed installation costs of electrified lines.

Railway Charges Inquiry Concluded

AFTER sitting on 11 days the permanent members of the Transport Tribunal, acting as the Charges Consultative Committee, on Friday last completed the public inquiry into the application by the British Transport Commission for an increase of 16⅔ per cent. in railway freight rates. On February 7 it will commence its consideration of the application for higher charges for docks and canals. Much of the proceedings on the last day were occupied by the final address by counsel for the British Transport Commission, but both Mr. David Blee and Mr. R. H. Wilson were recalled and subjected to some detailed questioning by the Chairman and members of the Committee. It is not expected that the Committee will await the evidence to be given on the dock and canal application before passing its advice to the Minister of Transport in respect of the railways.

On behalf of the Commission, it was argued strongly during the final session, that the application then before the Committee was for an emergency increase in charges to take care of the deficit already incurred. It was made amply clear that if the Committee advised in favour of giving the full advance sought by the Commission, the effect would be merely to offset in part the deficit accumulating on railway operations. If this deficit was permitted to run on until the Charges Schemes were introduced it might well be of unmanageable proportions.

The effect of any increase in railway charges on commodities, and secondly on railway traffics, is a matter of as wide concern to the railways as it is to the traders, for ultimately the railways tend to lose in two ways. There can be no doubt that in present trading conditions higher freight charges will tend to discourage traffic. At the same time, the advances which may be expected in the prices of coal, iron and steel, timber and a whole host of materials required by the railways for their own use will add to the burden of costs which the railways have to bear. At the same time, if the contention is well founded that "taking one year with another" the British Transport Commission cannot with safety permit a deficit to accumulate in the way it is doing at the moment, then a sense of reality requires that transport should be paid for by those who avail themselves of the services.

There can be no case for any suggestion of a subsidy for transport, for to embark on this course would be a grave blow at any hopes of improving the overall efficiency of the British transport administration. It was, perhaps, a pity that counsel for the British Transport appeared to suggest in his closing address that the Ministry of Supply, or some other body might decide that prices to the public might not reflect the full burden of higher transport charges. In doing so, he was by implication suggesting that the subsidies already in operation for certain products might be increased, although he had rebutted suggestions of a subsidy for transport.

The estimates which the British Transport Commission has made during the hearing of the probable trend of traffic admittedly cannot be tested for some months to come. On the other hand, they are based on all the indices and factors relating to the movement of goods and passengers which are constantly studied by a transport administration and they are unlikely to prove to be far wrong. It was noteworthy that the forecasts put forward by the spokesmen for the various trading bodies, who argued against the full acceptance of the application, although based in more optimistic terms, did not strongly refute the Commission's figures. In any event, there would seem to be a sufficiently wide margin between the effect of granting the Commission's appplication and the overtaking of substantial arrears of accumulated deficit, to offset any suggestion that the Commission's proposal is pitched too high.

The one point on which there may still be a sharp divergence of opinion is whether the present is an opportune time to bring forward a proposal for higher charges. The financial position of the British Transport Commission is not in doubt. According to the evidence which has been given, there is little prospect of any easement from large-scale economies, or anything of that sort. Nevertheless, there will still be a good many who will contend—not without justification—that the Act of 1947 gave the Commission a remit broad enough to enable it to run a loss even of the magnitude discussed before the Committee for the first two or three years of its life. It is difficult to foresee what may be the ultimate results of an increase in transport charges at this stage. Much will depend on the course of trade.

The U.S.A. Railway Situation

ISSUED by the Association of American Railroads (Car Service Division) on November 21, Monthly Bulletin No. 57, gives a crisp review of the rolling stock position in the United States. For the 45 weeks to November 12, the number of wagons loaded on U.S.A. railways was 31,365,000—more than 16 per cent. below 1948 and 19·5 per cent. below 1947. Every group of commodities showed large decreases from 1947, and all groups, except grain and grain products, were also behind 1948 by wide margins.

Normally, October is the peak loading month, but this year it was the worst on record, more than a third below the 1948 level and about 8 per cent. below 1932, at the depth of the trade slump. The long cessation of bituminous coal mining, which ended partially on November 10, and other labour troubles, accentuated a gradual decline in American output during the current year The railways had a large surplus of wagons on hand, and, as always happens when traders are not crying out for wagons, the turn-round time lengthened. In October, the time for all classes of wagons was 20 days; in the previous October it was slightly less than 13 days. Even box wagons, which were still in brisk demand, took nearly 14 days for a round trip in October, mainly due to the five-day week introduced on railways from September 1.

The bulletin tells how important traffic streams have shrunk. Coal shipments from Lake Erie docks are not likely to be much more than 34 million tons, at least one-third less than 1948 shipments. In the reverse direction, across the Great Lakes, iron ore from Lake Superior shipping places will be down by 15 per cent. to 70 million tons from nearly 83 million. During the first 10 months of this year, 15,367,000 gross tons of coal were moved by rail to Canadian destinations, a decrease of 35 per cent. from the 1948 total of 23,630,000. During the same period, the quantity of coal shipped abroad was short of 11½ million tons, 32 per cent. less than last year's export of 17 million tons.

A peculiarity of U.S.A. freight transits is the long haulage in refrigerator wagons of certain varieties of potatoes from Western States like Idaho, and from Maine. This season, potato forwardings have run about 45,000 wagons behind last year, but were expected to improve before the end of December. Another custom, typically American, is the estimating of future forwardings to the last unit. For example, the total fresh fruit and vegetable movement during November was put at 59,368 wagon loads. The December estimate of 64,700 loads looks more rational.

Often these estimates of loadings have been close to the mark, but this year some of the forecasts have been sadly to seek.

In America, despite all its wealth and natural resources, the time must be out of joint when, for the 9 months ended September, the railway operating ratio rose to 81 per cent. from 77 per cent. in the corresponding period of 1948 and railway earnings (before fixed charges) fell by one-third. The railways can do nothing to counter some of the causes of loss of net revenue, but it is passing strange that they cannot take effective action to hold high-class merchandise traffic passing in less-than-wagon-loads. Down to November 12 last, 4,050,000 wagons carried "smalls" 16 per cent. fewer than in 1948 and 24 per cent. fewer than in 1947. Twenty years ago, one wagon in every four carried small lots of traffic; now, the proportion is nearly one in eight. Unless the downward trend is arrested quickly, the railways will become mainly carriers of freight in full wagon loads. We look forward with more than usual interest to the publication of their final operating results for 1949.

Queensland Railways

IN his report for the year ended June 30, 1949, Mr. T. E. Maloney, Commissioner for Railways, Queensland, points out that the substantial increase in revenue over the preceding year was due partly to the fact that working in 1947-48 was interrupted by the railway strike. The rise in expenditure was due mainly to four wage increases during the year, coupled with the incidence of basic wage increases granted the previous year, and various legal and other measures affecting wages and conditions of employment, in favour of the staff. Of every pound spent, 13s. 10d. was for wages, with 2s. 3d. for stores and contingencies as the next biggest item, followed by 1s. 6½d. for interest on capital, and 1s. 3½d. for coal and other fuel.

The following are the more important results:—

	1947-48	1948-49
(a) 3-ft. 6-in. gauge lines	(thousands)	
Passenger journeys	29,128	32,491
Passenger train miles	4,553	6,405
Goods tonnage conveyed	5,232	6,591
Goods train miles	9,186	10,870
	(£ thousands)	
Passenger, parcels, etc., receipts	3,261	3,908
Goods traffic receipts	7,871	11,019
Total earnings	11,132	14,927
Working expenses	10,339	13,770
Interest on capital	1,464	1,473
(b) 4-ft. 8½-in. gauge lines*—	(thousands)	
Passenger journeys	198	196
Goods tonnage conveyed	291	297
	(£ thousands)	
Total earnings	400	465
Working expenses	279	369

* South Brisbane to New South Wales border section ("Uniform Gauge Railway")

Passenger journeys were 32 per cent. higher than in 1938-39, but the decline since the war may not have stopped, as the year 1947-48 was, as stated, abnormal; both country and suburban passenger traffics show increases. Goods traffic was a record, the main increases being in the tonnages of sugar cane, sugar, and wheat. The gross ton-mileage of 4,118,000,000 was only 16 per cent. below that of the peak war year 1943-44.

Coal supplies were both a traffic and a financial problem. The average haul was 167 miles, 45 miles farther than in the preceding year, and 99 miles farther than the average haul of coal for the public, because supplies were not allotted on a consumption basis. Owing to non-availability of wagons, a ship had to be chartered in August, 1948, to convey railway coal from Brisbane to Townsville, where its landed cost was £3 14s. 8d. a ton.

There was an acute manpower shortage, mainly in young recruits in various grades, in tradesmen, and in technical officers. Housing of the staff presented a difficult problem. In addition to the building (delayed by lack of men and materials) of various types of cottages and staff quarters, camping wagons were being improvised from passenger coaches.

Since the end of the war, 126 locomotives had been ordered from Australian and British builders, including 20 Beyer-Garratts from Beyer, Peacock & Co. Ltd. and 20 B18 type from the Vulcan Foundry Limited. The report states that at the end of the year under review only ten C17 class engines had been delivered; as a result, over 30 per cent. of engines were awaiting or under repair. A number of passenger vehicles were constructed at the Queensland Railways Ipswich workshops and by Australian builders, and the carriage-building programme included sleeping and "sitting" cars, the latter for both main-line and suburban services. For services in rural districts, six motor trains were on order, consisting of two power cars each with a 153-h.p. 6L3 Gardner engine and one or two trailers as required. Over 200 wagons of various types were placed in service, with 2,200 building or ordered, whilst tenders were being invited for a further 1,400 wagons.

Among major engineering works were the rearrangement of Toowoomba yard, on which good progress was made; the high-level bridge over the Elliott River, opened in April; and the new Albert River Bridge, of which the superstructure was being fabricated. A six-mile deviation on the Mount Morgan line was planned to allow of adhesion working and the elimination of a rack section between Moonmera and Moongan. Tenders were invited for a new station at Cairns, and a new station at Rockhampton was designed. Damage to track and station buildings in various parts of the State was done by cyclones and floods caused by heavy rainfall in February and March.

Electrification of suburban lines was still under consideration, further investigations having been delayed by the recent coal strike and other interruptions.

Danish State Railways

THE working results of the Danish State Railways for the year ended March 31, 1949, showed a considerable deterioration in comparison with the preceding year, as is shown by figures below:—

	1947-48	1948-49
Km. open	2,595	2,629
Passengers by railways and ferries (millions)	94·2	94·1
Goods (million tons)	8·7	8·0
Train km. (millions)	28·3	31·0
Operating ratio	95·3	108·1
	Million Kr.	
Passenger receipts	183·1	185·7
Goods and post receipts	133·4	126·6
Bus receipts	12·6	14·6
Other receipts	12·1	12·3
Gross receipts	341·2	339·2
Working expenditure	325·2	366·6
Net surplus	16·0	−27·4
Depreciation charges	5·9	6·8
Interest on capital	10·8	13·2
Surplus after charges	0·7	47·4

The improved fuel situation made it possible to improve passenger-train services, so that now 85 per cent. of the train km. run before the war has been achieved, and express and diesel services in particular increased. The number of passenger journeys was practically the same as in the preceding year, although the Danish State railways have taken over the private railway from Copenhagen to Slangerup. Copenhagen suburban traffic showed no increase, the number of passenger journeys being 55,600,000 as compared with 55,700,000 in 1947.

The fall of 8 per cent. in goods traffic was the same as in the preceding year, and was due mainly to increasing competition from coastal shipping and especially, from road hauliers. Another reason is that the production of home-made peat, which was large during the war, is still falling off. On the State Railways bus lines the number of vehicle-miles increased from 10,900,000 to 14,000,000, and the number of journeys rose from 12,200,000 to 13,700,000. The bus routes showed a net surplus of kr. 2,100,000.

Although there was only a slight increase in the total receipts, there was a considerable increase, kr. 41,400,000, or 12.7 per cent., in working expenses, for which there are two main causes. One is higher wages, which amounted to an increase in expenses of over kr. 17,000,000, and another to fuel expenses, which were up by kr. 16,000,000. Of the total train-mileage, about 57 per cent. was worked by steam engines, 33 per cent. by diesel traction, and 8 per cent. by electric multiple unit trains. Ferries and ships covered 815,000 km. during the year.

Roller Bearings and Rolling Stock Design

IN his paper entitled "Roller Bearings—Their Contribution to Modern Rolling Stock Design," which he read before the Institution of Locomotive Engineers on January 18, Mr. W. T. Thompson said that the number of roller bearing axleboxes supplied to all railways in the world must be now well over 1,500,000. The author dealt, first, with the application of roller bearings to the steam locomotive because of the variety of problems to be met with, although the application of roller bearings to electric stock and carriages mainly took precedence in the first stages of development. He thinks that this may have been due partly to the conservatism which, fortunately in railway practice, ensures that new developments are well tried before departing from established practice. Early experiments were mainly confined to carriage and wagon journals, where the engineers, who had no experience to guide them, were taking less serious risks than they would have done if the locomotive journals had been equipped with roller bearings and failures had resulted.

Happily, the early tests survived their teething troubles, and, thanks to the successful results, few engineers now questioned the reliability of the roller bearing to perform the most arduous tasks to be met in railway work. In the early stages emphasis was laid on the saving in fuel and power which would accrue, rather than in maintenace and increased availability, but with steam power it was difficult to guarantee savings in terms of coal consumed, because so much depended on the way the locomotive crew exploited the advantage offered by the roller bearing, such as the 85 per cent. reduction in the drawbar starting effort of each coach and the longer coasting runs which their use made possible.

Mr. Thompson referred to a report by Mr. E. L. Diamond on "Locomotives for Iron & Steel Works," which was the subject of an editorial article in our May 30, 1947, issue, and which in his opinion proved conclusively the advantages gained with heavily loaded roller bearing ingot cars; in the light of this knowledge it was not surprising that a number of steel works now recognised the added advantages which must accrue by also equipping the locomotives for hauling the ingot and slag cars. The weight of a main-line passenger locomotive and tender might comprise approximately 25 per cent. to 30 per cent. of the total train weight, and, therefore, if the former weight was roller-borne as well, appreciable reductions would be effected in the total train resistances, particularly at starting; the running resistance would also show an advantage in favour of the roller bearing up to certain speeds, but the advantage tended to be relatively less at higher speeds when the magnitude of the air resistances far outweighed the relative difference in the journal friction.

It was therefore not unexpected in view of their proven reliability that the demand for roller bearings on locomotives and tenders had increased considerably in recent years, and, in fact, the majority of passenger locomotives ordered from this country had roller bearings on their carrying axles and also in many cases on the coupled axles. Modern methods of flaw and crack detection were employed in the process of manufacture, so that the risk of a bearing seizure in service was remote, and, provided the bearing selected had proportions adequate for the job, trouble-free service could be assured. The author considered that bearings should be selected to outlast the wheel and axle sets, especially when the bearings were direct mounted and had a heavy interference fit. The initial outlay on roller bearings on locomotives would only be justified in terms of long life, which might vary between 500,000 and 2,000,000 miles.

The latest high-speed Pacifics on the London Midland Region, *i.e., Sir Wm. Stanier, F.R.S.*, and *City of Salford*, had now reached mileages of 118,000 and 106,000 (November, 1949) and had not yet been shopped for major overhaul; these mileages were already well in excess of usual permissible mileages between shoppings, and, although there were conditioning factors of tyre wear, cylinder valve liners, and boiler maintenance to take into account, the roller bearings would, he hoped, play a valuable part in increasing the useful mileage gained between major shoppings.

Regarding diesel-mechanical locomotives and railcars the author considered that ease in starting especially commended the roller bearing for these vehicles, and in particular for shunting work; the roller bearing mountings on inside journals could follow the principle of steam locomotives, although there was no need for the same elaborate protection of the bearings necessary for the steam locomotives on account of water problems and dust from the ash pans; also, where the axles were coupled, spherical roller bearings on the crank pins were an advantage, but could only be used on the crankpins where the wheel diameter permitted adequate rail clearance. Spherical roller bearings for the jackshafts were now commonly employed, and as the jackshaft boxes were usually fixed as separate units to the frame-plates, the ability of the bearings to give initial alignment was an important feature. Various designs of roller bearings as applied to carriages, wagons, electric locomotives, and motor coaches were dealt with, and the author emphasised that the purpose of the paper was not to prove the advantages to be gained by using rolling bearings, but rather to indicate how the roller bearing played an important part in modern design.

U.S. Railway Shareholdings in Bus Companies

IN the period shortly before the recent war, there was a marked tendency on the part of the U.S.A. railways to interest themselves in bus operation, both by direct ownership and also by substantial shareholdings, a movement paralleling that which took place in Great Britain, but with its own distinctive characteristics. In our issue of July 30, 1943 (page 118) we showed that the American railways were interested in some 5,200 buses by direct ownership, through associated road companies, or in co-ordinated workings.

With few exceptions, the road fleets tabulated at that time must have seemed small to British readers, but it must be recalled that public passenger road transport has not developed in the U.S.A. to anything like the extent it has here, and, in general, America has not such density of public road transport and frequency of service as are common in the British Isles.

The growth in the acquisition of railway interests in bus operations had largely ceased before 1939, and, since the end of the war, railway participation in this business has actually contracted. This contraction was brought out in an article entitled "The Bus as a Railroad Ally," which was published in the recent Passenger Progress Number of the *Railway Age*. This showed that co-ordination without common ownership appeared to be the trend and that some of the railways were selling off their subsidiary properties.

In recent years, the Santa Fe, the Burlington, and the Rio Grande have sold their entire interests in wholly-owned bus subsidiaries. Others, like the New York Central, have disposed of part of their financial interest in large independent operations. Those wholly-owned railway enterprises which remain are closely linked with train services, for the most part, providing feeder or train substitution services. Such operations characterise the remaining Santa Fe interests in California (which provide combined bus-rail-bus service between San Francisco and Los Angeles), the extensive network of the Gulf, Mobile & Ohio, and also the intensive Norfolk Southern bus operations.

After the passage of the Motor Carrier Act of 1935, railways found it difficult to secure permission to operate buses beyond the limit of their rail territory, and this limitation appears to have played an important part in causing the railways to be less interested in shareholding ownership. The *Railway Age* is of opinion that further incursion by railways into competitive bus operations seems unlikely, and that substitution of unprofitable rail services probably will be furnished by outside bus companies on a contract basis.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Long Station Platforms

January 17

SIR,—In your December 16, 1949, issue you have mentioned among the Rhodesia news the Bulawayo Station platform (2,422 ft.) as the longest in the world "so far as can be ascertained." I think it may be of interest to you and your readers to know that Bulawayo is beaten by the Swedish station of Storvik (situated 135 miles north of Stockholm on the main lines Stockholm-Boden and Gothenburg Gävle) which has a platform 2,470 ft. in length.

Yours faithfully,

BÖRJE THOURSIE
Assistant Divisional Engineer,
Swedish State Railways

Storvik, Sweden

Passenger Fares and Train Services

December 2

SIR,—I have read with interest the article headed "Passenger Fares and Train Services" in your September, 1949, issue. Troubles similar to these exist in Australia with the difference that revenues from competing services do not go into a common pool.

A tremendous amount of guess work, even if it is informed and intelligent guess work, is associated with estimates of what will follow this or that rate revision, and the authorities are loath to make drastic changes for fear they will not work out.

This is due in Australia to railway authorities having no idea of the cost of providing a particular service. I know only too well the difficulties associated with railway costing, but surely a panel of accountants could devise a system that would provide a reasonably accurate average cost below which in no circumstances should rates be cut.

Extra revenue means nothing if it is earned at a loss, and I have good reason to believe this situation has arisen on occasions in this country.

Yours faithfully,

A. J. SIMPSON

Spencer Street, Melbourne, Victoria

Cooper's Bridge Loading

January 16

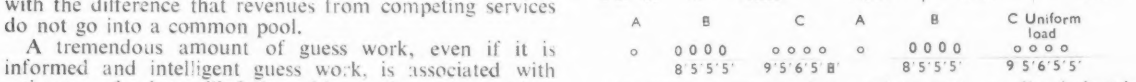
SIR,—The article entitled "Cooper's Bridge Loadings" in your issue of January 13, has come at a most opportune moment. While no doubt the designers of steam locomotives and bridge structures have understood this system, presumably many others, such as those in the electric traction industry, are not so conversant with it.

As your correspondent points out, the Cooper rating does not indicate the maximum safe load that the bridge can carry, but expresses instead the maximum load in terms of two stated steam locomotives with a specific axle spacing and loading. Being based on American experience, the Consolidation type of locomotive was adopted, and this is known to us as the 2-8-0. The bridge engineering determines what the weight of two of these locomotives would have to be to produce the maximum permissible bending and shear stresses on any particular bridge.

The Cooper rating applied to a locomotive would indicate the standard locomotive (of the previously-mentioned type) which will produce the same stresses for a given bridge as the locomotive concerned. It therefore follows that if the maximum permissible stresses in the bridge are not to be exceeded, the Cooper rating of the bridge must be higher than the Cooper rating of the locomotive.

A range of Cooper numbers has been established in America, each representing different weights of locomotive (always of the 2-8-0 type). A table covering a wide range is given below, and it will be seen that in all instances the Cooper number represents the weight of each driving axle in thousands of pounds. The weight on the guiding axle is assumed to be one half of that on the driving axle. The uniform load per foot of track which is assumed to be hauled behind the tender is taken as one-tenth of the weight on a driving axle. The weight on each of the tender axles is not so simply stated. In all instances the spacing of the axles remains constant at the dimensions shown on the left-hand side of the figures illustrating your correspondent's article.

Cooper load	Weight on leading axle lb. (*a*)	Weight on each driving axle lb. (*b*)	Weight on each tender axle lb. (*c*)	Uniform controlling load lb. per ft.
E-27	13,500	27,000	17,550	2,700
E-30	15,000	30,000	19,500	3,000
E-35	17,500	35,000	22,750	3,500
E-40	20,000	40,000	26,000	4,000
E-45	22,500	45,000	29,250	4,500
E-50	25,000	50,000	32,500	5,000
E-55	27,500	55,000	35,750	5,500
E-60	30,000	60,000	39,000	6,000



As your correspondent points out, a diesel-electric locomotive has a maximum effect (based on its axle load), smaller than the Cooper number would suggest; the improvement may be of the order of 5 per cent. The absence of dynamic augment from all vehicles which lack reciprocating parts means that their Cooper numbers are again conservative, because the equivalents between Cooper ratings for bridges and Cooper ratings for locomotives has hitherto been based on the steam locomotive in which such augment can be a serious factor.

The Cooper number allocated to a bridge or a locomotive should not be confused with the maximum permissible axle weight which is determined by the strength of the rail and the permanent way.

Yours faithfully,

F. W. ROBERTS

Ashdown, Western Road, Billericay

4-6-4 Metre-Gauge Tank Engines

January 14

SIR,—I have read with interest the article under the above heading appearing in your issue of January 13, but regret that nowhere therein do you mention the railways for which these locomotives were originally ordered. The indent for these ten tank engines came from the Burma Railways. This I know as the design was carried out by the Consulting Engineers and the Vulcan Foundry Limited to specifications given by me when acting chief of the mechanical department of the Burma Railways in Simla on reconstruction work, 1943-1945.

The engines were required to work the Rangoon suburban services, the most exacting of which was the run from Rangoon to Insein, with eleven intermediate stops in nine miles. Some years before the war this was run in 34 min. by the 4-6-4 tanks of the A and As class, which were then all superheated. The earlier slide valve ones, built by Beyer, Peacock & Co. Ltd., dated from 1916. These were, however, merely tank engine versions of the 4-ft 4-6-0 B.E.S.A. mixed-traffic engine, and their narrow fireboxes were not the most economical on a service with so many starts. The new engines therefore were specified with a wide firebox and with the piston stroke increased from 22 in. to 24 in.

Because of the frequent stops a front end regulator on the superheated side was specified in conjunction with a

centrifugal steam drier in the dome. To meet the objection to condensation in the superheater elements when cooling down a separate shut-off valve in the dome was provided. The dome was placed as near the centre of the boiler as possible to avoid lifting water when starting bunker first, to which the original design of A class tank engine was particularly prone, having the dome midway between the tube plates. The original 4-6-4 tank engines also suffered from hot boxes due to water overflowing from the side tank fillers. It was for this reason that I asked for the filler holes on the bunker tank so that any overflow falls clear.

Another feature of the design is that the bogies are designed to take additional weight so as to reduce the maximum axle load to 10 tons and render them "go-anywhere" machines should electric or diesel suburban services subsequently be introduced. It is greatly regretted that, due to the chaotic state of Burma, the engines have had to be sent elsewhere, as it was hoped, by their use, to cut the Rangoon-Insein run to 30 min.

Yours faithfully,

E. V. M. POWELL

Chinthays, Woodside, Lymington

1948 Locomotive Exchanges

January 21

SIR,—The details of this letter are dictated to me by a fireman on the Southern Pacifics who has recently passed for driver.

He wants to ask Mr. Thomas of Brighton whose letter appeared in your January 20 issue, with what load the Plymouth-Brighton train pulls in "dead on the dot" every night. Are not these locomotives extravagant in coal and water for the work done? His experience is that they use an average of 14 pints of engine oil a day for the middle "engine" alone plus about six pints for the two outside "engines," as against six pints for a whole locomotive of the "Schools" class.

Are these Pacifics entirely free from troubles that so far have not been rectified, both with the sanding and with gauge-glass breakages? Have the difficulties yet been entirely overcome of uneven running caused by uneven wear of the chains driving the middle valve-gear? Are none of these engines unduly in the shops through the breaking of the said chains?

Yours faithfully,

E. A. GURNEY-SMITH

Ormiston Hotel, Sevenoaks

January 19

SIR,—With reference to the letter from Mr. Maxwell regarding the above subject which appeared in *The Railway Gazette* of December 23, I was not aware that there had been an "epidemic of twisting and excuse-making" as he terms it, regarding Mr. Bulleid's Pacific engines, and I think he must be a little prejudiced, with a leaning towards *ex*-G.W.R. engines, of which I think he has practical experience.

First, does Mr. Maxwell think that these Pacific engines never climb heavy banks with a really dirty rail, because I can assure him that they do and without difficulty, despite their propensity to slip; in fact, as Mr. Cecil J. Allen has pointed out in his book "The Locomotive Exchanges," these engines perform their best work up-hill, and this is confirmed by practical experience in the Southern Region.

Secondly, the enginemen concerned in the tests were not given any specific instructions as suggested and acted strictly in accordance with the pilotmen's instructions; as a matter of interest, in Scotland, some of Driver Swain's running was a little restricted because of dialect difficulty—there were no stunts, as I can confirm as an unofficial observer during a number of the preliminary and test runs. After the tests were over, I sent some photographs to Driver Swain and I append a copy of letter I received from Passed Fireman Hooker who acted as fireman, showing what they thought of the West Country engine *Yeovil*, which they took to Scotland for the tests.

"Engine 34004 behaved splendidly on the test trips and the chief of the dynomometer car, Mr. Jarvis, congratulated Jack on his performance over a very difficult road. On the first trip we had slightly over 350 tons with a banker on the rear from Blair Atholl and we left Straun and stopped at Dalnaspidal in 19 minutes, 31 being allowed; the pilot driver remarked that she wasn't an engine but a flying machine! Someone from St. Rollox works who was in the car said that the banker was a waste of motive power. On the southbound ascent of Druimuachdar we left Dalwhinnie with 350 tons and went over the summit at 43 m.p.h.

"There is no doubt that the Southern have given the natives something to talk about for months, and she is the best engine that has probably worked over the Highland line. We completed the trips with very little mechanical trouble, although on our way home to England the left small end ran hot, but righted itself before we got to Crewe; it started hollering as we were going over the border—apparently 34004 did not want to leave Scotland, but wanted to level down a few more of the mountains.

"The powers that be had their last pound of flesh from us on the Saturday morning we were to return home. . . . as they were short of engines we had to work the train, made up to 17 bogies! It was a sort of final glory for the Southern as the pilot driver wanted to arrange for assistance over Beattock from Carstairs, but with load reduced to 16 there, 34004 marched them over the summit with very little fuss. We had difficulty starting the 17 at Motherwell, as after a "pull up" we were on a curve and a gradient of 1 in 143, but after several setbacks away she went. We were relieved that we did not have to ask for an engine to help start them, although that is quite a common occurrence at that particular spot. No. 34004's reputation soared a bit higher after that in the pilot driver's estimation, especially as we could turn the top of the banks without being 'winded,' or short of steam."

Although I admit that these engines have their defects, some of which have been and are being overcome, the fact is that despite the exchange tests, one has not yet seen their full capabilities when handled on banks with the regulator fully open and using a short cut-off. During 1942 tests were held over a period between Salisbury and Exeter with Merchant Navy engine 21C3 hauling a 15-bogie train (approximately 515 tons), when the full regulator was consistently used throughout, Mr. Bulleid being present on a number of occasions. In all cases the banks were surmounted without difficulty and with a full head of steam, and as an example, on one trip, Honiton incline, ruling gradient 1 in 80, was climbed in the down direction at an average speed of 57 m.p.h., and in the up direction, the average from Honiton to Honiton incline was 52·1 m.p.h., and the speed on the top of Hewish summit was 68·9 m.p.h., speeds never before known in Southern Railway working with such a load.

Subsequently, a Merchant Navy engine worked an express train from Waterloo to Exeter and the 5·55 p.m. intermediate stopping train from Exeter to Waterloo with a load of 20 bogies, without difficulty, the schedule being maintained.

Therefore, I would say to Mr. Maxwell that in due course when we can run without any speed limit and tell the driver "to have a go," as Mr. O. S. Nock termed it recently, when referring to these engines in a contemporary journal, I will back Driver Swain of Nine Elms, who took part in the exchange trials, or any other top link driver regularly handling these engines at Nine Elms, Salisbury, Exmouth Junction, or Bournemouth Central, against any Western Region driver or engine he likes to produce and show them a clean pair of heels at a speed that the latter engines rarely reach.

Does Mr. Maxwell, who resides at Newton Abbot, refer to any particular Region when he says that four-fifths of the late running of passenger trains can be traced to Control and signalmen, because I can assure him as a Divisional Superintendent that this does not happen on the Southern Region?

Finally, let us remember that innovations and new ideas are not always received with open arms, but it is only by persistent efforts that progress is made, and I suggest that Mr. Bulleid is to be congratulated on producing unorthodox engines that have yet to show their full capabilities, maybe even in other Regions, where they can regularly tackle much heavier loads. I may say that I have experienced some very fine running behind the larger engines of the other Regions on many occasions, and hope that I am able to judge the question impartially.

Yours faithfully,

A. EARLE EDWARDS

"The Heath," Walton-on-Thames

THE SCRAP HEAP

C.P.R. Taxes

For every day of its existence since 1883 the Canadian Pacific Railway Company has paid more than $13,000 in taxes.

Gesture of Sympathy

Railmen in Argentina stopped work for 10 minutes in silent sympathy for Eva Peron, who is recovering from an appendix operation. Their union ordered the stoppage.—*From the "News Chronicle."*

Railway Mayors

At the invitation of the Mayor of Derby, Alderman C. F. Bowmer, who is Assistant Foreman in Derby Works, the six members of British Railways, London Midland Region, staff who this year are officiating as Mayors of English Boroughs toured the works on Thursday, January 19.

Nylon Transport

Cairo has been clamouring for "nylon" trams so long now that the transit company has finally been warned that it stands to lose its franchise if it does not do something. "Nylon," an American gift to the colloquial vocabulary, is the slogan used in any demand for something modern, shiny and up with the times. The term, popularised by street hawkers, no longer has anything to do with stockings. Egypt's new diesel locomotives are strictly "nylon."—*From an article by Patrick Doyle in "Cuisle na Tire" (Ireland's Transport Magazine).*

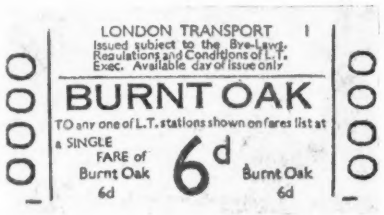
Old Documents Return to Euston

Some 150,000 legal documents belonging to the London Midland Region of British Railways have just made a journey in three railway vans from the strong room at Derby Station to be stored in the deed room in the Doric Arch at Euston, whence they were removed at the outbreak of war.

The documents form part of the title deeds and records of property purchased by the earliest railways, and in many cases the family historical records of the former owners are attached, some dating back to the third century A.D.

New Underground Tickets

London Transport is experimenting with a new type of ticket in which the name of the issuing station and the fare paid are shown in large print, instead of the usual list of destination


LONDON TRANSPORT
Issued subject to the Bye-Laws, Regulations and Conditions of L.T. Exec. Available day of issue only
BURNT OAK
TO any one of L.T. stations shown on fares list at a SINGLE
FARE of
Burnt Oak 6d
6d
Burnt Oak 6d

points. The tickets were first tried at six stations for lower denomination fares and the trial has subsequently been extended to 18 stations for all tickets.

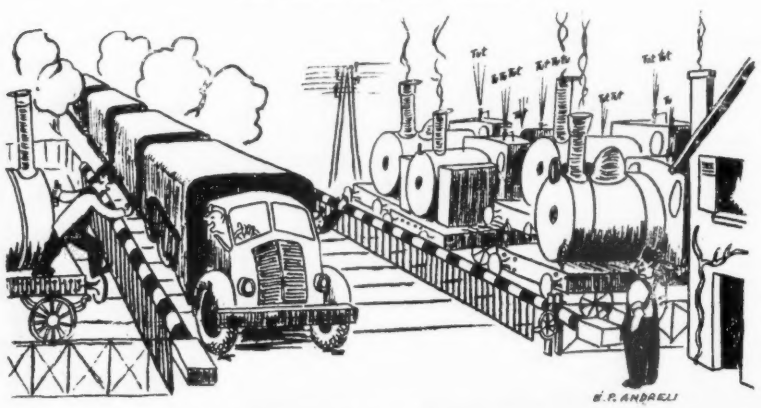
Thorpe Bay Station Christmas Tree

The stationmaster and staff at Thorpe Bay Station, Eastern Region, decided to provide a Christmas tree on the station last Christmas. This was much appreciated by passengers, and contributions, amounting to £5 10s., are to be handed to the Sunshine Home for Crippled Children at Shoeburyness.

Canadian Centenary

The oldest part of the Canadian Pacific Railway will celebrate its centenary this year although the C.P.R. itself did not come into existence until 1881. On May 1, 1850, the St. Lawrence & Industry Village Railway was formally opened, and the first train ran north of the St. Lawrence River. This little line was built by Barthelemy Joliette, and ran 12 miles between Lanoraie and Industry village, since renamed Joliette.

The Road Haulier's Dream



A French contemporary views the road-rail problem

(From "Notre Métier")

The Last Train

Bearing a large placard reading: "In memory of B.C.D.R.—Born 1869; co-ordinated 1950; aged 81 years; executioners, Brooke and Pope," the last main-line train from Newcastle, County Down, arrived in Belfast on January 15.

About 500 people saw the train off at Newcastle, and about 300 passengers made the journey, instead of the usual 100. Most of them bought two tickets —one for the journey, and the other as a souvenir.

At stations along the route, crowds gathered, and detonators were placed on the line to greet the train. At Belfast there was a continuous barrage of explosions as the train drew into the station. Railway officials said there was very little souvenir hunting.—*From "The Irish Times."*

Motive Power, 1950

(An ode to the gas turbine)

Listen to my tale, good gossips, for, today, I'm super-charged;
With exuberant verbosity my ego is enlarged;
I've discovered that the over-rated power of pen and sword
Cannot stand the least comparison beside the spoken word.
Though at times I have professed myself a sceptic and have winced
At such oral emanations, I confess myself convinced
That, co-equal with the indestructibility of matter,
One can ultimately bet on the utility of chatter.

Now at last my failing eyesight sees some reason for the craze
For the everlasting nattering which seems to fill our days,
For these never-ending arguments regarding nothing much
Can be turned to useful purpose if you've only got the touch
Advocated by some amiable genius *en Suisse,*
Who reduces every kind of conversational caprice
(Even "So-and-So's" inveterate, lamentable loquacity)
Into manageable elements of motive-power capacity.

When our legislators ladle out the stuff that stirs our ire,
Trotting forth their tarradiddles with those tongues that never tire,
Let us bite upon our bullets like the heroes that we are,
Let us count each little blessing, let us thank each lucky star
And put up with oratorical effusions *en masse,*
Now we know that Britain's locos may in future run on gas
And that heated air engendered by unlimited verbosity
May be reproduced in favourable terms of high velocity!

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

EAST AFRICA

Link with Rhodesia

On January 18, three representatives of Northern Rhodesia (the Director of Development, the Financial Secretary, and the leader of the European unofficial members of the Legislature) began talks in Nairobi with Sir Reginald Robins, East African Transport Commissioner, on the second phase of the proposal to link the East African and Rhodesian Railways.

The first phase was the preliminary survey indicating several routes. The second is the detailed survey dealing not only with routes but also with economic factors. A body of official opinion favours first a railway from Rhodesia to join the new Southern Province line, Tanganyika, providing an early outlet to the east coast for Rhodesia, and also a new source of traffic for that line.

SOUTH AFRICA

General Traffic Results

The weekly earnings total for all railway services reached a new high level in the week ended December 3, 1949, with a total of £1,578,124. The previous highest figure for 1949 was £1,563,979 in the week ended October 15. In the total for the first week of December passenger revenue amounted to £332,819, or £7,000 less than in the corresponding week last year.

In the first three months after the opening of the new Odendalsrus line, which serves the Orange Free State gold fields, 55,264 tons of traffic were moved over the line. In the corresponding period of the year under review the total increased to 135,912 tons. Passengers increased from 3,591 to 9,088 in the same period.

Springs-Welgedacht Line

The new line from Springs to Welgedacht was authorised in 1943 at a cost of £107,751. It was intended to provide for the increasing traffic between the Springs-Brakpan-Nigel area and the Eastern Transvaal. The section east of Apex carries the heaviest regional traffic in the Union; it includes suburban traffic to Geduld, the entire service to the Witbank section, and other trains to Geduld, all of which have to be worked through the junction at Apex. When completed the new Springs-Welgedacht line will serve the double purpose of relieving congestion at Apex and providing a more direct link between the East Rand towns and the coalfields.

The new route was surveyed in 1938, but, due to shortage of manpower and material during the war, it was not until July, 1946, that construction work began. The line is just over five miles in length, and it will have a ruling gradient in both directions of 1 in 100, with easy curves. The original estimate has risen to nearly £500,000, of which about a half has already been spent, and a further £50,000 has been set aside for the current year.

Fencing and track are almost complete, and at the intermediate station the platforms, goods shed, and offices are finished and the trackwork in the yard is in hand. With much of the traffic at present handled at Apex to be diverted to Welgedacht when the new line is completed, additional marshalling facilities will become necessary at Welgedacht, and the preparation of the site for a new yard at that centre has already begun.

INDIA

Doubling on Delhi-Mathura Section

After Partition in 1947 a section of the up-country traffic formerly handled by Karachi was diverted to Bombay. This severely strained the capacity of the single-line section between Delhi and Mathura (Muttra) which became a bottleneck on the main route from Bombay to Delhi. The Railway Board sanctioned partial doubling, covering 43½ miles, of this section in April, 1948. The work was divided into two phases, the first being completed in February, 1949, with the doubling of the sections between Ballabhgarh and Okhla, 16·46 miles, on the G.I.P.R., and between Okhla and New Delhi, 6¼ miles, on the E.P.R. The second phase, comprising the doubling of sections between Mathura and Chhatikra, 6¼ miles, and Chata and Hodal, 14 miles, was opened to goods traffic on December 1 last. As soon as the formation consolidates sufficiently the new line will be opened to passenger traffic.

SWITZERLAND

Door-to-Door Goods Service

The Federal Railways have decided to add 123 closed and open containers to their container stock. A credit of fr. 2,400,000 was recently granted for the acquisition of these containers, as well as of 41 special wagons for their conveyance by rail, together with seven special tractors required for their handling.

Cheaper Fares on Rhaetian Railways

To encourage passenger traffic on the Rhaetian Railways cheap two-day return tickets were introduced just before Christmas on the mountain lines of the system on which the high fares, including considerable "mountain surcharges," have been much criticised by the local population. The return trip between Pontresina and Poschiavo now costs fr. 15·75 instead of fr. 19·95, and the return fare Chur-Arosa is now fr. 10·65 instead of fr. 13·50. The problem of more sweeping fare reductions has been left in abeyance for the present, pending the decision to be taken by the Confederation on financial assistance to the Rhaetian Railways.

The precarious financial position of the Rhaetian Railways has made it imperative to curtail train services to the utmost compatible with the needs of the population and the requirements of the international tourist traffic. These are to be the leading considerations in framing the 1950-51 timetable.

Rhaetian Railways Problem

Members of the Government of the Canton of Grisons called on the Federal Government at Berne on January 12 to make representations as to the position of the Canton as a result of its financial connection with the Rhaetian Railways. The delegation was met by the heads of the Department of Railways & Posts, the Department of Finance, and the Department of Economics.

The Canton has granted to the Rhaetian Railways loans totalling about fr. 42,000,000 and holds fr. 20,000,000 of their share capital; at present, the Rhaetian Railways are not even able to pay interest on the loans, thus causing the Canton an annual loss of fr. 1,500,000, which has to be found by the taxpayer. As taxation in the Grisons is the highest in the whole of Switzerland, it is impossible to increase it further without causing the few industrial concerns in the Canton to transfer their undertakings to other areas. The Government of the Grisons has been pressing the Federal Government since 1941 to incorporate the Rhaetian Railways in the Federal Railways. The present step underlines the urgency of the situation.

ITALY

Holy Year Traffic

Naples, as the transatlantic port nearest to Rome (only 133 miles as against 311 miles for Genoa), is expected to benefit most from the heavy tourist and pilgrim traffic from North and South America which has already begun. Most passenger liners from beyond the Atlantic make Naples their first port of call in Italy, and a number of services usually operated direct to Genoa are being diverted for the occasion. To assist travellers, a special Pilgrim Tourist Office has been opened at Naples Central Station; it includes a railway information section, a special department of the Tourist Board of the Province of Naples, and an exchange office of the Naples Bank.

FRANCE

Increase in Paris Passenger Fares

As an outcome of the discussions recently held by the Paris Municipal Council on the deficit of the Paris passenger services (underground lines and bus services) the view has been expressed that an increase in the fares is now considered as unavoidable and is

likely to be introduced at once. The increase will bring the Métro basic fare to fr. 12 or 13 and the bus fare to fr. 6½. The supplement hitherto charged on Sundays is to be abolished.

Formerly it had been expected that the deficit for 1950 would be about fr. 3,255 million, approximately £3,321,200, but it is now believed that it will not be less than fr. 4,500,000,000, about £4,591,850. It was pointed out during the discussions that the financial situation could be considerably improved, without increasing the fares, by reducing the price which the Paris Transport Board has to pay for electric power, as well as by an adequate rebate in the petrol tax, in conjunction, however, with an increase in the subsidies paid by the State. According to a statement made by the Chairman of the Regional Transport Office, the supplementary charges facing the Régie Autonome des Transports Parisiens in 1950 originate partly from the increased allocation for new rolling stock, and partly from an increase in salaries, wages, and so on to staff.

GREECE

International Connections

The completion of the reconstruction of the Athens-Salonica line, reported in our December 23 issue, has enabled the problem of the through railway connection between Greece and the rest of Europe to be approached again. Agreement has been reached with both Jugoslavia and Turkey.

With Jugoslavia the through connections are to be resumed on the Salonica-Belgrade main line over which the normal civilian traffic between the two countries has been discontinued since 1941. The best connection, before the war, was maintained on this route by a portion of the "Simplon-Orient Express," running to Athens, and leaving the main train at Nish, 151½ miles from Belgrade. It is expected that the best railway connection between Greece and the rest of Europe will again be by the "Simplon-Orient" over this route.

The resumption of the through traffic on the other railway line connecting the two countries, from Salonica northwestwards to Armenochorion, and to Neos Kafkassos, the Greek frontier station, 125½ route-miles from Salonica, and thence to Kremenica, in Jugoslavia, the terminus of a 90-mile standard-gauge line, from Titovo Veles and Bitola, has been left in abeyance as of less importance.

On the route to Turkey local trains only have been operating between Salonica and Alexandrupolis, with connecting local trains between Alexandrupolis and Pithion, the Greek junction and frontier station of the Sofia-Istanbul main line. A twice-weekly through train had been arranged several months ago to operate between Salonica and Istanbul, taking three days with overnight halts, but was never put in operation.

The train was to have carried a first and second class sleeping car between the two termini and passengers were to have slept in the car during the overnight stops. These had to be included because of security reasons, as areas in that part of Greece had been infested by rebels operating from the Bulgarian frontier north of the railway.

Before the war, a stopping train ran between Salonica and Alexandrupolis in 12 hr. 22 min., a fast train, with 18 intermediate stops, in 10 hr. 28 min. It has been stated that an improved timetable is being drawn up for the Salonica-Istanbul through connection.

POLAND

Rolling Stock Production

According to particulars in a survey of the economic activities of the Silesian provinces, recently drawn up by the Ministry of Economic Affairs, the wagons works at Wroclaw (formerly Breslau) is now one of the most important in the country. In addition to building passenger coaches, sleeping cars, and postal and luggage vans, the works has a capacity of some 700 goods wagons a month.

NETHERLANDS

Increase in Fares and Rates

Fares and rates are to be increased from February. Single fares will be increased by 5 per cent. and the percentage increase in return fares will vary in accordance with the distance. The reduction for return fares will be smaller. For example, the single fare for the journey between The Hague and Groningen will average 30 per cent. more, whatever the class, and the return fare 52 per cent. more than in 1939. Between Amsterdam and The Hague, the new single fare will mean an increase of 45 per cent., and the new return fare an increase of 73 per cent. compared with 1939.

Goods rates for complete wagon loads will be increased more than for small consignments. These increases are stated to be unavoidable by reason of the 5 per cent. wage increase granted to staff after devaluation.

Publications Received

Some Classic Locomotives. By C. Hamilton Ellis. London: Allen & Unwin Limited, 40, Museum Street, W.C.1. 9½ in. × 6¼ in. 173 pp. Fully illustrated. Price 21s.—The author has made a comprehensive survey of various types of locomotives from the Crampton design of a century ago to the locomotives of today. He describes many locomotive types, detailed attention being given to such noteworthy examples as Alexander Allan's Crewe type and the Beattie locomotives of the London & South Western Railway. Of considerable interest is an account of the development of the Beyer-Garratt locomotive. The many illustrations, including colour-plates as well as photographic reproductions, cover both the older and the modern type of engines.

United Steel Companies: Review of Progress.—An illustrated brochure has been published by the United Steel Companies Limited, Sheffield, and is being issued to each of the 30,000 employees of the firm, reviewing the progress of the group during the last two years. The publication gives the production figures of various products and the distribution of gross income. In a message to the staff, the chairman, Sir Walter Benton Jones, reviews the activities of the group since its amalgamation in 1918, from which date production has increased from 684,832 tons of steel to over 2,000,000 tons.

Railway Signalling. By Maxwell Taylor. London: Sampson Low, Marston & Co. Ltd., 25, Gilbert Street, W.1. 7½ in. × 5 in. 84 pp. Illustrated. Paper covers. Price 3s. 6d. net.—This work is not addressed to the signal engineer or operating officer, but seeks to provide a good general account of the basic principles of railway signalling, and the chief means used on British Railways to give effect to them, together with some facts connected with the development of present-day equipment and the trends likely in the future. The text is supported by a number of simple diagrams and a useful selection of photographs. No technical knowledge is assumed on the part of the reader. The author has contrived to mention most, if not all, of the items which would present themselves to the mind of anyone interested in the subject, but who has not previously studied it seriously. We notice one or two slips, as, for example, when it is stated that the lifting of the shoe in the Western Region system of A.T.C., closes an electric circuit. The book will be helpful to that wide circle of readers to whom the operation of a railway is a never-failing source of interest, particularly to those who find signalling an especially fascinating topic.

Aluminium in Patent Glazing.—The Northern Aluminium Co. Ltd., Banbury, has issued an illustrated brochure on the puttyless glazing system known as patent glazing, for large runs of roof lights on pitched roofs, and for ridge, ventilating, and lantern lights. The several types of glazing bar are usually intricate in design, achieving both ease of erection and efficiency in service. By using aluminium the designers have been much less hampered by considerations of manufacturing technique, and have been able to create mechanically efficient bars of minimum weight. The illustrations depict installations in which aluminium glazing bars are now being used. A collection of case histories shows the length of life to be expected from these bars, even in the most exacting conditions.

Gradients in Hump Marshalling-Yards

Factors influencing the choice of gradient for hump sorting

By H. W. Warwicker, A.M.Inst.T.,
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DECISIONS concerning hump marshalling-yard gradients may be influenced by a variety of factors, some of which, outside the scope of this article—which is based on personal experience—may have been involved in the construction of existing yards.

In considering the choice of gradients the first decision to be made is at what speed wagons may be allowed to collide without causing damage to their contents. A reasonable estimate is approximately 4 m.p.h. which would allow a fair margin of safety for ordinary traffic. The gradient on the hump must accelerate the wagons to this speed, and, from the foot of the hump, over the points, and at the entry to the sorting sidings, the gradient must be sufficient to keep the vehicles at the same speed until they are clear of all other sidings. Alternatively, if the hump gradient is such that wagons attain a greater speed, and this is maintained until the wagons enter their respective sorting sidings, the gradients in those sidings must be such that the wagons are slowed to 4 m.p.h. before they collide with wagons already in the siding.

This eventuality would necessitate a rising gradient just inside the sorting siding. The slower-running wagons might not mount such a gradient, and, apart from the possibility of them running back foul of other sidings, the next cut for that siding would collide with them before its speed was reduced. This arrangement obviously is not practical, and may be ignored, for, as will be seen later, a greater speed than 4 m.p.h. is not required unless a fantastic number of wagons per shunting hr. is expected.

It must now be determined what gap between cuts is necessary to enable points to be safely reversed; experience suggests that about four wagon-lengths should be sufficient.

Average Length of Cuts

When the size of the normal average cut has been decided, all the data required are available. It is exceptional to find cuts of all single wagons following one another, but allowance must be made for single wagon cuts. If a cut of a single wagon follows one of two, or more, wagons, there is a longer interval between the cuts leaving the hump than if both cuts were of single wagons. Similarly, a cut of a single wagon followed by one of two, or more, wagons also entails a longer interval. The question arises, therefore, as to whether an average cut of 1·5 wagons, that is, alternate cuts of one and two wagons, may be assumed.

When the wagons reach the king points they must be travelling fast enough to ensure the previously decided gap of four wagon-lengths between each cut. The time interval between cuts leaving the hump is governed by the propelling speed, and on the average will be the time taken by the cut to pass over the hump summit. The average cut of 1·5 wagons, therefore, must travel 5·5 wagon-lengths at the king points in the same time as it took to pass over the hump summit. As the speed at the king points has been decided as 4 m.p.h., the propelling speed must be $1\frac{1}{2}$ m.p.h., that is, it must bear the same relation to the final speed as the distance covered at the summit of the hump does to the distance covered in the same time at the king points, 1·5 to 5·5.

The gradient of the hump, then, should be such that the wagons are accelerated from $1\frac{1}{2}$ m.p.h. to 4 m.p.h. There is no advantage in this instance in having a long gradient; in fact, there are advantages in keeping the gradient as short as possible. It should be as steep as the engineer can make it compatible with safety; this will give the quickest acceleration, and, if brakesmen are employed to regulate the speeds, the shortest return walk for them.

Extreme Conditions

Given the steepest possible gradient, it should only be long enough to ensure a slow wagon in bad weather conditions attaining 4 m.p.h. at the bottom. Provision for the slowest wagon in the worst possible weather would not be justified as such a combination of circumstances will not occur very often, and as increasing the speed of the faster-running wagons only increases the cost of braking, it is not desirable that the extremes should be catered for.

From the foot of the hump the gradient should be such that it will keep a slow wagon at 4 m.p.h. until it is clear in the sorting siding. Faster-running wagons will accelerate on this gradient and should be braked to below 4 m.p.h. on the hump.

At the propelling speed given, each average cut will pass over the hump in approximately 19 sec. and cuts will begin to descend the gradient at intervals of this time. If brakesmen are employed on the hump to make adjustment to the speed of the faster-running wagon, and to cuts of multiple wagons, a man will have to become available at the hump summit at intervals of 19 sec. At the official walking speed of 3 m.p.h. a railwayman can cover just over 27 yd. in this time. If the hump gradient is steep enough to accelerate the wagons in less than 27 yd., two brakesmen on the hump should be in a position to provide all the braking power necessary, one braking a cut while the other is walking back to the summit.

If these assumptions are correct, whatever speed is attained on the hump, and whatever method of braking is used, the wagons should not leave the foot of the hump at a greater speed than 4 m.p.h., and, to allow a reasonable gap for point operation, the cuts should follow at intervals of not less than about 19 sec. As this rate of shunting can be obtained with two brakesmen, it is necessary to ask whether the capital cost, maintenance, and operating costs of mechanical retarders are justified.

A higher speed of shunting can only be secured by increasing the speed at which the wagons enter the sorting sidings; this would necessitate some form of braking in each sorting siding, as following cuts for adjoining sorting sidings must be considered. This is an expensive proposition and, in any case, the figures above show that about 275 wagons can be shunted per propelling hr. if the gradients are as outlined. If it is assumed that 50 per cent. of the shunting pilot's time is occupied propelling, about 3,300 wagons would be shunted in 24 hr. by one engine. This is a very satisfactory figure.

To sum up, the speed of the wagons entering the sorting sidings is the main factor governing the rate of shunting. The propelling speed varies in direct proportion to this speed and also to the number of wagons a cut. It varies inversely as the gap required between cuts and may be expressed by the formula:—

$$P = S \times \frac{C}{C + G}$$

where P is the propelling speed; S is the speed into the sorting sidings; C is the number of wagons per cut; G is the wagon lengths of gap between cuts.

If a form of retardation is not to be used in the individual sorting sidings, S cannot be increased much above four m.p.h.; G cannot be reduced below about four wagon-lengths; C is fixed by circumstances out of the control of the yard staff. Provided the gradient on the hump is steep enough and long enough to accelerate wagons from P to S, any increase in steepness or length is not only wasteful in expense of construction, but also entails additional expense in providing retardation arrangements to reduce the speed to S without resulting in a faster rate of shunting.

INSTITUTION OF RAILWAY SIGNAL ENGINEERS.—At a meeting of the Institution of Railway Signal Engineers, to be held at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m. on February 8, Mr. P. W. Ottley will read a paper on "London Transport Telecommunications."

Flame-Cleaning Structural Steelwork

Advantages of thorough cleaning as protection against corrosion

By R. E. Walsh, M.C., M.A., B.Sc., A.M.I.C.E.

WHAT counts most in repainting steelwork is not so much the painting as cleaning before painting. To put paint on top of rust is worse than useless, because the paint film is bound to be so thin at rough spots as to admit moisture, and the moisture which is already within the rust is enough to continue corroding under the paint.

Corrosion having started, so long as any traces of rust remain, it will almost certainly continue, no matter how good or how thick the paint film over it may be. Corrosion is inseparable from new steel sections because, in rolling, oxides are formed on the surface in the shape of mill scale. A very rapid and extensive formation of oxide is due to combustion of the outer skin of the red-hot steel.

Mill Scale

Much mill scale is very loosely bonded to the base metal and must be removed before painting takes place. Weathering for six months in the open is a time-honoured method of getting rid of this scale. But the agency by which the scale is loosened is surface rusting underneath it, and if this continues after the scale has gone, a fresh trouble is introduced. A part of the mill scale is so tightly bonded that the weathering treatment has no effect on it.

The whole of the scale does not come within the latter category. If it were continuous over the whole surface of the metal, it would be an excellent preservative against rust, and would almost do away with the necessity for any painting at all.

The two extreme kinds of mill scale, however, are sporadically distributed, and there are intermediate varieties which take varying periods of exposure to become loose. As pinhead blistering extends, due to corrosion, it undermines more and more of the scale.

Rusting is accelerated when the moisture contributing to its formation is held under the shelter of an overlying patch of mill scale, rust scale, or paint, in close contact with the metal, for evaporation in these circumstances must be slow.

Flame cleaning will remove all the various kinds of oxide which constitute rust, including all but the very firmly bonded mill scale. It will also heat the metal, and thoroughly dry it, and by differential expansion will split off intractible layers of rust scale. If the priming coat of paint is applied before the metal cools off to the ambient temperature, the covered surface is virtually sterile of any rust-forming materials, namely, oxides and moisture.

The only exception is the metallic-looking oxide of which the highly bonded mill scale is composed. It seems that this will remain in an unchanged condition for an indefinite period, and hence is not detrimental.

Flame-cleaning equipment resembles that used for oxy-acetylene welding and cutting, except that nozzles are used instead of blowpipes. These may be flat, round, or semi-circular, depending on whether completely flat surfaces, rivet heads, or circular members are to be cleaned.

A nozzle has a large number of small orifices so that the flame takes a brush-like form and is equally effective over the whole of its perimeter. The flat nozzles are available in a gradation of widths varying from 1 to 12 in.

The cylinders of oxygen and dissolved acetylene should be manifolded in sets of three for each gas, and arranged vertically for ease in operating the valves and reading the gauges. In the case of the dissolved acetylene the draw-off of the gas from solution might be too rapid if fewer than three cylinders were coupled up; and unless they are in the vertical position, liquid instead of gas might be fed into the pipes and hose. Flexible hoses lead from the regulator valves at the cylinders to the operator, who can control the relative proportions of the gases by a mixing valve at the base of the nozzle shank.

Advantages of Flame Cleaning

Cleaning down to the bare metal is quickly accomplished on surfaces which are not encrusted with scale. Owing to the high velocity of the gas jets issuing from the nozzles, a high temperature is produced which almost instantaneously converts light surface corrosion into little metallic globules which are removed with a wire brush, and the finer products of combustion are dusted down with old paint brushes. In this way the shiny, silvery surface of the steel is exposed entirely free of all foreign matter.

As a preliminary to flame cleaning it is economical to remove any adhering grease, and even the top coats of old paint, by treating with a paint remover, such as sugar soap, as these are slow-burning and would require an unduly prolonged application of the flame to get rid of them.

When there is much scale the heavier incrustations should first of all be removed as far as practicable by hammer blows, leaving only the firmly bonded scale next to the metal for treatment by the flame.

The second advantage of the flame, namely, descaling, is shown here. The high temperature of the jets when passed over the scale causes differential expansion between it and the metal underneath, or between the top layers of scale and the underlying ones. This action is demonstrated by the pistol-like reports which accompany the splitting-off of the scale layers; if these are thick, two or three passes of the flame may be necessary to bring the base metal into view. Between each pass the work must be allowed to cool down, so that the benefit of the temperature gradient is obtained each time.

Dehydration

The third advantage, namely, dehydration, applies equally to all steelwork, whether new or old, when the cleaning, preceded by descaling where necessary, has been completed. After the scale, with its dual propensity for harbouring moisture either physically or in chemical combination when it consists in part of ferrous hydroxide, has been eliminated and the surface of the steel warmed up, the most favourable conditions for paint application are presented.

The residual heat in the steel holds it for a reasonable period of time above the atmospheric temperature and keeps it immune from condensation and perfectly dry. Advantage should therefore be taken of these conditions to apply the priming coat of paint, for paint applied to a warm, dry surface adheres to it with an exceptional degree of tenacity.

After this thorough cleaning process, which has involved a heavy outlay in labour and gas, subsequent painting should comprise every possible refinement in choice of material and mode of application available to ensure durability.

Three, or preferably four, coats of paint are justified: a priming coat, a covering to the priming coat, an undercoat, and a finishing coat. Spray painting is not recommended, as a brush penetrates better into the interstices in the metal, and the spray is liable to pick up moisture in its passage through the air.

Paint technology has not yet produced a primer with qualities as a rust-inhibitor superior to red lead mixed with raw and boiled linseed oil. There are many other anti-corrosion primers on the market, with trade names and ingredients some of which, such as aluminium, are divulged and others kept a trade secret. Many of these are very good, and are cheaper than red lead, but have not yet been proved better.

The urgency in this process is in applying the priming coat before the steel has cooled down to air temperature, that is, before condensation occurs on the surface of the metal.

The covering of the priming coat need not differ greatly in constitution

from the latter, though part of the red lead may be replaced by white lead, and there should be a proportion of turpentine or white spirit incorporated. It should differ sufficiently in tint from the priming coat to facilitate the inspector's duty of checking that it has really been applied; an admixture of red oxide of iron would provide the desired distinction.

The undercoat is usually grey, and for structural steelwork often contains a big proportion of white lead with raw linseed oil and turpentine or white spirit. It must be constituted to form a suitable backing for the finishing coat, as regards ingredients and tint.

When a careful examination of a structure is made, it is surprising to find to how much the condition varies over the different parts. To remove good paint which is affording sound protection is wrong. Nothing more than hand cleaning and two coats of paint should be attempted in such conditions.

Other parts which may be exposed to the prevailing winds and rain and to the sun will be found probably to be pitted and discoloured and generally fit subjects for flame cleaning. Both sides of these parts must be flame cleaned, as the heat would be conducted through the metal and blister the paint on the other side. Both sides must be cleaned and painted within a short space of time before the residual heat has had time to disperse. Good, old paint will not suffer if the flame is kept not less than some 4 in. from it. This marginal strip should be hand cleaned before painting.

Painters may tend to clean uncorroded surfaces cursorily, not realising the necessity for completely sterilising surfaces before painting. Particles of rust which are almost invisible can cause a resumption of corrosion, particularly if the material is a hydroxide, for it contains water in chemical combustion; these particles should be reduced to a metallic state by the intense local heat of the flame, and the resulting globules brushed off. Absolute freedom from further corrosion under the paint cannot be secured on account of the possibility of slight impurities, such as minute slag or sulphite particles, in the original steel.

In the case of bridges with low headroom over sluggish non-tidal waterways, rafts are more suitable than staging. The battery of gas cylinders can be erected on a separate raft and floated round the work. If headroom is very much restricted, rafts enable this to be exploited to the maximum advantage, since they need have a freeboard of only 2 in. or 3 in., whereas staging would be higher than that above the water level. The raft carrying the cylinders can be moored in mid-stream when untended and thus remain free from interference.

Many steel structures have both exposed and protected parts, and staging should enable operations to switch over to the protected parts as and when the weather deteriorates, thus ensuring against idle time.

It is difficult to quote representative figures for the cost of flame cleaning, as the types of work vary so greatly. Moreover, the various parts of the same structure differ in the amount of labour and gas required to descale and clean them; in some cases the designer has not sufficiently borne in mind the need for making all parts easily accessible for painting; some surfaces are situated so that moisture speedily dries off them, whilst others harbour it, and therefore tend to corrode much more quickly.

Some Cost Figures

An average figure for cleaning bridges which have been reasonably well maintained with oil paint is about 9s. a sq. yd. The price of oxygen is 38s. per thousand cu. ft. and of acetylene 125s., with cylinders of 200 cu. ft. capacity. The actual measured area is paid for *plus* an allowance of 5 per cent. for rivet heads.

The large areas of web-plate bays are usually quickly cleaned, but the top surfaces of flanges are often frequently heavily pitted and even encrusted with scale, whilst places such as the lower ends of stiffeners may be deeply eaten into by rust. This mode of measuring may seem inappropriate for these bad places, but in practice it is as good a method as any other.

When work is to be done by contract, the areas for the various items in the bill of quantities are obtained from the drawings or from approximate measurements at the site. Subsequently, when the work is carried out, the actual girth and length dimensions are taken and agreed between the contractor and the clerk of works, and the final bill drafted for scrutiny by the engineer.

Rubber Tyre Coaches in Switzerland

As a result of the decision of the Swiss Federal Railways in December, 1947, to undertake working tests with two rubber-tyre coaches in service conditions, orders for two prototypes were placed with two Swiss wagon-building works. One was to have a lightweight all-steel body, the other an all-aluminium body, as mentioned in *The Railway Gazette* of June 18, 1948.

The body of an ordinary fast-train lightweight steel carriage of the Swiss Federal Railways weighs 22,880 lb., and the steel body of the rubber-tyre coach will weigh only 10,780 lb. As with the Micheline-type coaches forming the three rubber-tyre *rapides* now in service between Paris and Strasbourg, this saving in weight is imperative because the weight of the complete vehicle must not exceed 15 *tonnes* so as to avoid an excessive load on the rubber tyres, and with the same object each bogie has ten wheels.

Although the three French trains consist exclusively of rubber-tyre coaches, the two Swiss prototypes are to be included in fast trains composed of coaches with ordinary steel-tyre wheels.

These considerations, together with the fact that the coaches are the first with rubber-tyres to be built in Switzerland, prompted the decision of one of the builders, Schweizerische Wagons-und Aufzügefabrik, Zurich-Schlieren, to undertake the extensive tests and measurements of the steel body. These tests, relating to vertical and longitudinal stresses, were again carried out and demonstrated in January, when a special American electrical measuring instrument was placed in operation.

All the tests have been supervised by Monsieur Gaspard, a French engineer and rubber-tyred coach expert of the French National Railways, working in co-operation with Monsieur Robert Guignard of the traction and workshop section of the Swiss Federal Railways.

All the experts consulted agreed that the tests carried out have been entirely successful. Considerably higher stress values then obtaining in normal service conditions were reached without exposing the steel body to any harmful consequences.

THE TOURIST INDUSTRY IN BRITAIN.—Addressing the business group of the Allied Circle (Alciric Limited) on January 17, Mr. Stanley Adams, Chairman of Thos. Cook & Son Ltd., said that the travel industry would be our biggest single dollar-earner for the third year in succession, and drew a parallel between the expansion of his firm since 1841 and the opening up of the world by transportation. The hotel question, he said, was a national matter; it might be that at some time in the future public money would have to be advanced for the object of building hotels without interest, but with a big fund for amortisation. Sir Patrick Hannon, President of the National Union of Manufacturers and Deputy-Chairman of the B.S.A. Co. Ltd., presided at the meeting.

SULZER ENGINE BUILDING AGREEMENT SIGNED.—Richardsons, Westgarth & Co. Ltd., and Sulzer Bros. (London) Ltd., announce that an agreement has been concluded under which the former company will manufacture Sulzer engines for land installations at the Sunderland works of their associated company George Clark (1938) Ltd. Sales will be handled by Sulzer Bros. (London) Ltd.

Electric Motive Power on Russian Railways

A review of voltages used, and existing and proposed types of locomotive in the Soviet Union

IN a recent issue of *Technische Rundschau* a Swiss engineer, W. Hurlimann, writes on the types of electric motive power in use on the Russian railways. Research on electric traction was begun shortly after the Revolution. In 1924 the Baku-Sabuntschi suburban line was electrified for experimental purposes. The Moscow suburban lines followed in 1928; and shortly afterwards some further suburban sections in the vicinity of Baku were electrified.

Since 1931 electrification has been extended to long-distance lines. Among the first were several sections of the Trans-Caucasian Railway and in the Donetz Basin. Certain sections in the vicinity of Leningrad and Perm, and on the Murman and Trans-Siberian Railway followed later. At present the electrified sections total at least 2,000 miles. All the electrification so far has been with direct current, and the following voltages are used:—

(*a*) 750 V.: for certain industrial branch lines in Siberia and the Ural mountains.

(*b*) 1,200 V.: for the Baku suburban area. Power is taken from 20,000-V. feeders and is converted to 1,200 volts d.c. in two substations by means of rotary transformers.

(*c*) 1,500 V.: for the Moscow and Leningrad suburban lines, which are supplied from the high-voltage grid through a number of mercury arc rectifier substations. The output from the substations is 1,650 volts so as to allow for voltage drop.

(*d*) 3,000 V.: for all main lines. Substations, fed by high-tension lines at 6,000, 33,000 or 100,000 volts, are spaced at average intervals of 25 miles and mostly equipped with mercury arc rectifiers. Rotary transformers are used only on sections where regeneration is required. The substation output is 3,300 volts.

Alternating current at 20,000 volts, 50 or $16\frac{2}{3}$ cycles, is used on experimental sections only.

So far, Russian designers have preferred the Co-Co wheel arrangement, which is used for 80 per cent. of all locomotives. The first motor coach on Russian main lines was an 82-seat vehicle designed in 1924 for the Baku-Sabuntschi line. It is equipped with electro-pneumatic contactors and can be controlled from a driving trailer. There is no electric braking. The 110-volt supply for the control and auxiliary equipment is taken from a motor-generator.

The motor coaches for the Moscow and Leningrad suburban lines run in train sets with trailers and driving trailers. They have four motors arranged for series or series-parallel connection. The latest type has a maximum speed of 80 m.p.h. and accommodation for 105 seated and 52 standing passengers.

Among electric locomotives is a heavy-duty shunting class, "Ge 4/4," used since 1935 in certain industrial areas in the east (such as Magnitogorsk). The design has two four-wheel bogies and four traction motors, which can be operated in series, series-parallel, or parallel.

Seven experimental goods locomotives, Class "Ce 6/6," were delivered in 1931 by the General Electric Company of the U.S.A. for the Trans-Caucasian Railway. They have two three-axle bogies and six motors, giving a tractive effort of 39 *tonnes* at starting. Another experimental locomotive of slightly higher power for the Trans-Caucasian Railway was supplied by the Italian B.B.C. Works.

Together with these American and Italian-built locomotives, the first Russian-built electric locomotive ("VL-19") was placed in service. The mechanical parts were produced by the Kolomna factories, and the electrical equipment by the Dynamo Moscow Works. This machine was succeeded after the war by the more powerful "VL-22" series with an axle load of 22 *tonnes*. Other successors of the "VL-19" were the "SK-22" and "SK-23." The latter develops 3,700 h.p. at the one-hour rating and is the most powerful electric locomotive in Soviet Russia.

The only electric locomotive specially designed for express passenger trains is the "PB-21," built in 1935. The three driving axles and the four-wheel bogies at each end run on roller bearings. All wheel sets and motors are interchangeable. The electro-pneumatic control equipment provides 42 accelerating and 15 rheostatic braking notches. There are 18 notches in series, 13 in series-parallel, and 11 in parallel, including one full-field and two weak-field running notches in each combination. The electrical equipment is protected against short-circuits, overloads, and over-voltage by a high-speed circuit-breaker. Speeds of 110 m.p.h. have been reached on trial runs.

The programme of the Fourth Five-Year-Plan includes the following additional types:—

(*a*) A heavy-duty locomotive of 5,350 h.p. at the one-hour rating, for a maximum speed of 100 m.p.h.

(*b*) A lighter-duty locomotive for express trains with a maximum speed of 90 m.p.h.

(*c*) A fast motor coach for speeds up to 110 m.p.h.

Prototypes of these three categories will shortly undergo trials.

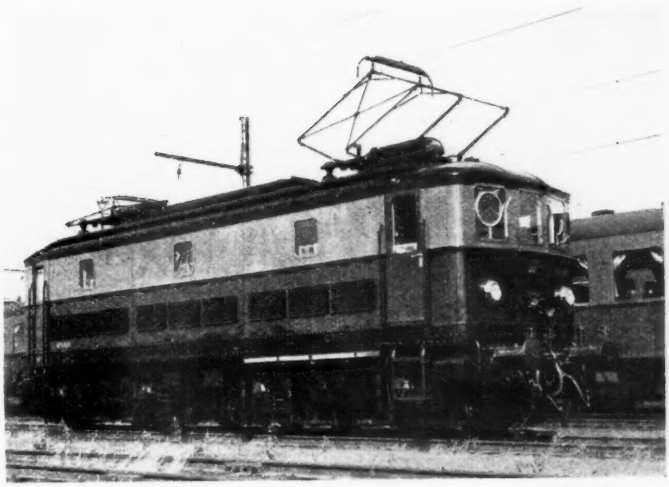
The essential technical data of the types referred to are tabulated above.

—	Motor coaches		Locomotives							
Year built	1924	1928	1935	1931	1931	1937	1946	—	—	1935
Classification	—	—	—	—	"Si"	"VL-19"	"VL-22"	"SK-22"	"SK-23"	"PB-21"
Wheel arrangement	Bo-Bo	Bo-Bo	Bo-Bo	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	Co-Co	2-Co-2
Total weight in *tonnes*	38	—	70	132	132	114	132	132	138	124
Adhesive weight in *tonnes*	38	—	70	132	132	114	132	132	138	69
Normal supply voltage	1,200	1,500	750	3,000	3,000	3,000	3,000	3,000	3,000	3,000
One-hour ratings—h.p.	380	816	1,000	2,775	3,050	2,760	3,260	2,760	3,700	2,760
Tractive effort (*tonnes*)	—	—	13	24	28	20	—	—	—	11
Speed (m.p.h.)	—	—	12	21	18	23	—	—	—	44
Continuous ratings—h.p.	—	—	800	2,405	2,550	2,430	—	—	—	2,430
Tractive effort (*tonnes*)	—	—	11	22	25	17	—	—	—	9
Speed (m.p.h.)	—	—	13	23	19	24	—	—	—	46
Maximum speed (m.p.h.)	47	53	22	49	40	47	—	56	56	80

NORTH BRITISH TANK LOCOMOTIVES FOR EAST AFRICA.—The North British Locomotive Co. Ltd. has received an order for 18 4-8-2 tank locomotives for the East African Railways & Harbours. The locomotives are equipped for burning oil fuel. The maximum load at the rail on any one pair of wheels will not exceed 13 tons, and locomotives will be capable of traversing curves of 290 ft. radius. As it is contemplated that ultimately the gauge of the East African Railways may be increased from one metre to 3 ft. 6 in., the frames are to be set to suit metre gauge, and cylinders and motion arranged to suit 3 ft. 6 in. gauge. The boiler, with firebox of the round-top type, will have the inner box of steel plates of all-welded construction. The water capacity will be about 1,700 gal., and 4 tons of oil fuel will be carried in the bunker. The estimated weight in working order will be 78 tons, and the tractive effort at 85 per cent. boiler pressure 30,000 lb. The order is valued at £250,000.

Belgian Railways First Electric Locomotive

New Bo + Bo design built in Belgium for main-line mixed traffic service at 3,000V. d.c.



LAST summer Belgian firms completed and delivered to the Belgian National Railways the first of the locomotives required for the comprehensive main-line electrification scheme now in progress in the country. The new machine is a mixed traffic Bo + Bo of 2,200 h.p. for 3,000 V. d.c., powered by four nose-suspended 1,500-V. motors, each pair of motors being permanently in series. Control is effected by series or parallel connection of the two pairs.

The principal dimensions and other characteristics of the locomotives are as follow:—

Overall length	42 ft. 3 in.
Total wheelbase	29 ft. 4 in.
Bogie wheelbase	9 ft. 8 in.
Wheel dia.	4 ft. 5 in.
Weight in working order ...	80 tons 4 cwt.
Motors (4)—	
1-hr. rating	550 h.p.
Continuous rating	450 h.p.

The locomotive is of all-steel construction and is carried on two articulated four-wheel bogies. Negotiation of sharp curves is facilitated by allowing for longitudinal movement of one of the pivots in the bolster. Most of the controls in each driving compartment are grouped on a desk at a convenient height for operation while seated. The large end windows give an excellent outlook in all forward directions and are fitted with wipers, and anti-frost devices.

In the centre of the body is the high-tension compartment, with the traction equipment arranged along the side walls and the motor blowers and compressors occupying the centre. Access to the H.T. apparatus is possible only when the pantographs are lowered, the protecting doors being held locked except in this condition.

The motors on the corresponding axles of each bogie form a pair from the electrical point of view, an arrangement which facilitates the checking of wheel slip caused by unequal weight distribution when starting or accelerating. This is accomplished by a relay arranged to weaken the fields of the motors on the slipping axles, which in these circumstances would be the leading axle of each bogie according to the direction of running.

Roller bearings are used throughout except for the axle bearings of the motors. Each motor drives through pinion and resilient gear transmissions at both ends of its shaft, the gear trains being enclosed and running in an oil bath. The reduction ratio is 1:3·38. Maximum speed in normal service will be 62 m.p.h., and the design has been worked out to fulfil the following haulage conditions:—

Speed with 1,476-ton goods train on level	37 m.p.h.
Speed with 1,033-ton goods train up 1 in 100	25 m.p.h.
Speed with 295-ton passenger train on level	62 m.p.h.
Maximum tractive effort	35,274 lb.

Current from the line passes to the equipment through a high-speed circuit-breaker, and protection for the motors against excess currents and earth faults is afforded by overload and differential relays. There are 21 notches in series and 18 in series-parallel, 16 of which are running notches (full series and full series-parallel plus four weak-field notches in each condition). The weak-field steps give reductions of 17, 28, 39, and 50 per cent. on full field, and are obtained by diverter resistances with an inductive shunt in series to counteract the effect of current changes in the field windings, which otherwise would tend to induce voltages high enough to cause flashover at the commutators.

All the H.T. contactors and other switchgear, except the manually-operated pantograph switches and motor cut-outs are electro-pneumatic, and are supplied from a 72-V. battery charged

(*Continued on page* 110)

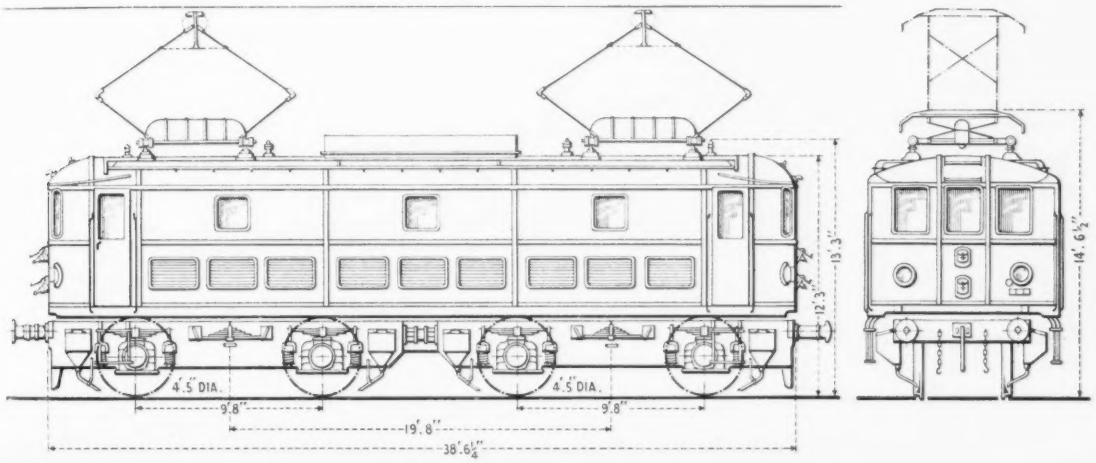


Diagram showing dimensions of Belgian Bo + Bo locomotive

Electrification from Laroche to Dijon Inaugurated

First stage completed in the conversion by the S.N.C.F. of the former P.L.M. main line from Paris to Lyons

WITH the running of the first electric train on the Laroche-Dijon section of the Paris-Lyons main line on December 15 last, the opening stage of this major S.N.C.F. conversion project was officially inaugurated. Electric working of goods traffic between these points has now begun, and regular passenger services with electric traction are scheduled for May this year. The next step will be the extension of electric services over the whole of the Paris-Dijon route, activity having been concentrated latterly on this section for financial reasons, although much preparatory work has been done between Dijon and Lyons.

First steps towards electrification were taken during the occupation of France in 1941, but were suspended in 1943 because of shortages of raw materials. Work was resumed in 1946 and has been pushed forward rapidly since then, although still hampered by restricted supplies of copper and lead, and in a smaller degree of steel and cement.

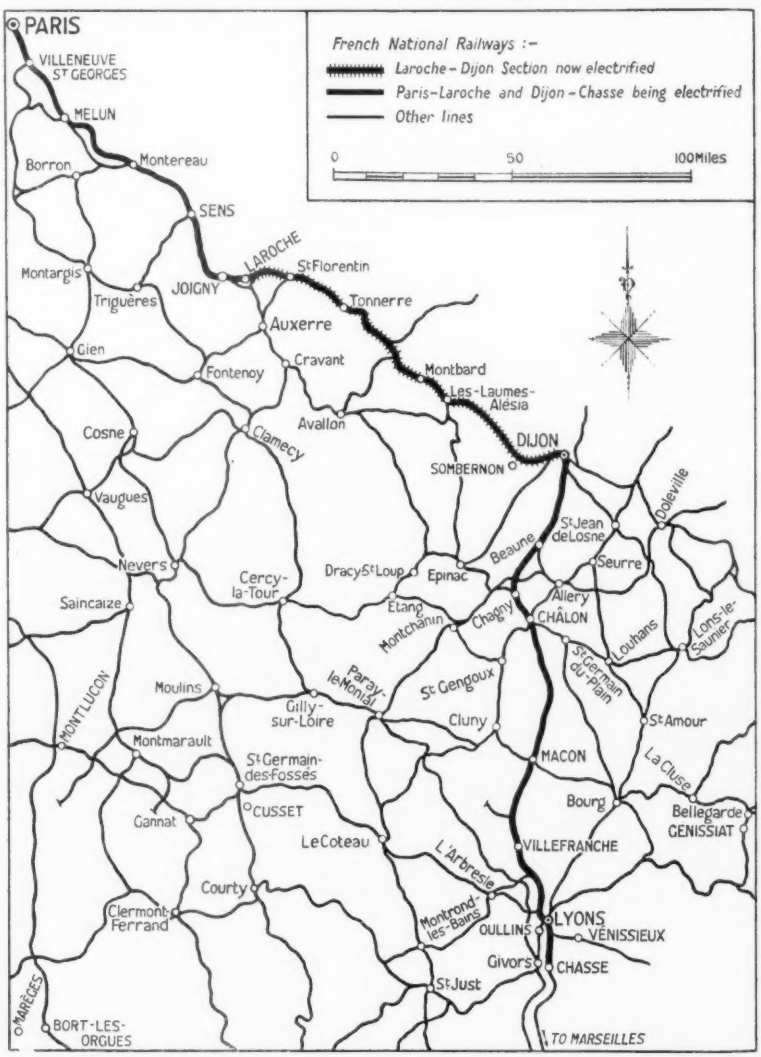
The Paris-Lyons scheme as a whole, including the avoiding loops from Villeneuve-St.-Georges to Melun and Melun to Montereau, and the extension south of Lyons to serve the agricultural area of Chasse, involves the conversion of 388 route-miles. From Laroche to Dijon, the section already converted, is 96½ miles, while the Paris-Dijon section throughout totals 196 miles. For most of the way from Paris to Dijon there are four tracks, except for 52¼ miles of double track between Saint-Florentin and Les Laumes, and another 16 miles between Blaisy and Dijon. Over the first 4¼ miles from Paris to Villeneuve-St-Georges there are six tracks.

The heaviest gradients on the whole Paris-Lyons route occur on the newly electrified section between Laroche and Dijon, and are in fact concentrated in the last 36 miles from Les Laumes-Alésia, where the line crosses the Seuil de Bourgogne. In the 160 miles from Paris to Les Laumes they nowhere exceed 1 in 200, but for 10 miles from that station the line rises at 1 in 125 to the summit of 1,328 ft. at Blaisy-Bas. The 16-mile descent to Dijon begins in Blaisy-Bas Tunnel (2½ miles), and here also the four tracks change to two, carried by a series of bridges, viaducts, tunnels, and deep cuttings through rocky terrain with high embankments and retaining walls.

To relieve traffic congestion on this double-track section, arrangements have been made for reversible working, to run trains in either direction on both lines under centralised control of signals and points from Dijon (see our May 20, 1949, issue). Similar centralised control may be applied later to the other double-track section between St. Florentin-Verigny and Les Laumes-Alésia, 52¼ miles.

Power for the whole line is being supplied from the high voltage grid of Electricité de France through eight 220 kV. or 150 kV. transformer stations feeding the 60 kV. railway cables. These are in duplicate over most of the route, each consisting of three phases having a total cross-section of ⅛ sq. in. and an earth conductor of 3/16 sq. in. cross-section. The two feeder cables are carried independently on 80-ft. pylons.

Between Paris and Dijon, substations with groups of transformers and mercury-arc rectifiers to supply d.c. at 1,500 volts to the overhead contact line have been built at intervals of about ten miles. Each is equipped with two 4,000 kW. groups, which may operate simultaneously at peak periods. Between Dijon and Lyons the substations will be about five miles apart. Each will have a single transformer and mercury-arc rectifier group of 4,000 kW. Certain substations on busy or steeply-graded sections have three 4,000 kW. groups, one being in reserve. In all, 52 substations are planned for the entire Paris-Lyons line. All substations



Part of South Eastern Region and adjacent lines, S.N.C.F., showing sections of main line already electrified and to be electrified

will be under remote control from three centres, Paris, Dijon, and Lyons. All control and metering functions are effected over two pairs of wires linking the substations of each group, signals for different substations being distinguished by frequency.

Construction of the substations has been simplified to the utmost. All equipment is interchangeable. Each transformer, rectifier, circuit-breaker or other accessory is mounted on small rollers, so that it may be quickly removed for repairs. The floors are raised 2 ft. above the level of the branch railway track, serving each substation, so that the apparatus can be run on to a railway wagon. Any item also may be replaced with equal facility. This arrangement saves space by eliminating handling and dismantling of apparatus for repairs inside the substation. Consequently the substations are of smaller area than previous types, the larger, with two or three equipment groups, measuring about 76 yd. by 33 yd.; and the smaller, with a single group, about 33 yd. by 22 yd. There are no large central switchboards, but individual panels adjoin each group of apparatus, an arrangement which saves much internal cabling. The concentration of control in the hands of operators at three remote supervisory points has made the provision of much automatic apparatus at the individual substations unnecessary.

A series of mobile transformer and rectifier equipments mounted on railway wagons has been constructed for emergency use. In case of prolonged breakdown at a substation with one or two 4,000 kW. groups, one of the mobile sets will be despatched to share the load with the remaining serviceable apparatus.

Cabin with centralised control for Les Laumes-Blaisy Bas section

Between Dijon and Lyons the substations will have one 4,000 kW. rectifier group each, but the shorter intervals of five miles will permit the two substations on each side of one that develops a fault to maintain service over the affected section. This short spacing was not adopted between Paris and Dijon because of the lengthy four-track sections to be supplied and the number of 1,500 V. outlets that would have had to be provided at each substation. However, the provision of two rectifier groups per substation capable of operating together to meet peak demands, maintains the same principle.

The overhead line on the main tracks consists of main and auxiliary catenaries supporting two copper contact wires with automatic adjustment of tension between certain temperature limits. This construction is the same as on the Paris-Le-Mans and Tours-Bordeaux lines, but the cross-section of the contact wires has been increased from $\frac{3}{8}$ to $\frac{1}{4}$ sq. in. Feeders carried on the same supports as the catenary system

Dijon Station, the termination of the present electrification

make up the total cross-sectional area of copper required.

On double-track sections the contact lines are supported by separate pylons for each track. Gantry spans have been erected on four-track and six-track sections, some of which carry signals as well as supporting the catenaries. Most of the pylons and gantries are of steel lattice construction, but on certain double-track sections, totalling 107 miles, they have been made of pre-stressed reinforced concrete. Total numbers of the various types for the whole of the Paris-Lyons main line are: steel lattice, 17,500; pre-stressed reinforced concrete, 6,000; and combined contact line and signal gantries, 180. In addition, 4,000 pylons were required for tracks at stations.

Combined catenary and signal gantry

The pylons are fixed in solid concrete foundations, the concrete being poured from a specially fitted train alongside. On 41 large bridges concrete bases were impracticable and special fixtures were devised. In 20 tunnels, the roof above the catenary was made watertight to keep the contact line and insulators dry.

The change in the loading gauge necessary to accommodate the catenary involved many structural alterations. The line is spanned by 173 road bridges and 21 footbridges, and passes through 21 tunnels with a total length of 12,646 yd. The level of the tracks was lowered under 95 bridges and in 20 tunnels, amounting to a total length of 63 miles. The roadway level was raised on 41 road bridges and 16 footbridges. Five footbridges were demolished. At St. Florentin a reinforced concrete arch of 170 ft. span, weighing 1,500 *tonnes*, was raised 1 ft. 4½ in. Eighteen road bridges were rebuilt.

Much additional engineering work has been necessary to make the line suitable throughout for the higher speeds envisaged with electric traction, this comprising realignment, easing of curvature, and removal of speed restrictions in other ways. Six flyovers are being constructed to provide clear paths for main-line trains and effect other operating improvements. A notable example is at Dijon, where the main line enters the station in a broad circular sweep over the junctions with the lines from Dôle and Nancy and the tracks from the Perrigny locomotive depot. Other junctions being rebuilt in this way are as follow:—

Paris.—Crossing of suburban tracks by empty carriage road over which main-line stock reaches the terminus.

Macon.—Divergence of Bourg line.

St. Germain-au-Mont-d'Or.—Crossing of main line by up line from marshalling yard.

Lyons.—Divergence of lines to Bourg and Amberieux.

Vigneux.—Crossing of up Corbeil suburban line by goods lines from Villeneuve yard to Corbeil.

Existing d.c. track circuits have had to be replaced by a.c. circuits. These conversions involve 152 miles of double track with automatic block signalling; 379 miles of double track where manual block is being converted to automatic; and 79 signal boxes with electric interlocking. Some signal boxes have been rebuilt on more suitable sites, and the positioning of signals has been revised where necessary in the interests of speed and line capacity.

Platforms at all principal stations have been lengthened to 400 m. (437 yd.) to take the longer and heavier electric trains, the passenger formations ranging up to 750 or 850 *tonnes* if necessary, made up of 14 coaches and two vans. Permissible freight train loads will be as much as 1,300 or 1,500 *tonnes*. Sidings for freight trains along the line and in marshalling yards have been lengthened accordingly. Fifty refuge sidings have been provided with direct access from the main line, without reversal; and 23 new refuge sidings have been laid. To permit a locomotive axle-load of 23 *tonnes*, the permanent way has been strengthened and new rails laid on 125 miles of the main line.

Existing overhead telephone lines of the national postal services and of the S.N.C.F., as well as signalling circuits, were frequently too close to the railway to leave room for the contact line. Even where there was sufficient room, the telephone lines still would have been subject to induction from harmonics in the rectified traction current. To shift the wires far enough back would have required costly acquisition of land. Another essential consideration was that electric traction called for new and completely reliable links between sub-stations and remote control offices. In agreement with the postal administration it therefore was decided to place the telephone and signalling circuits underground.

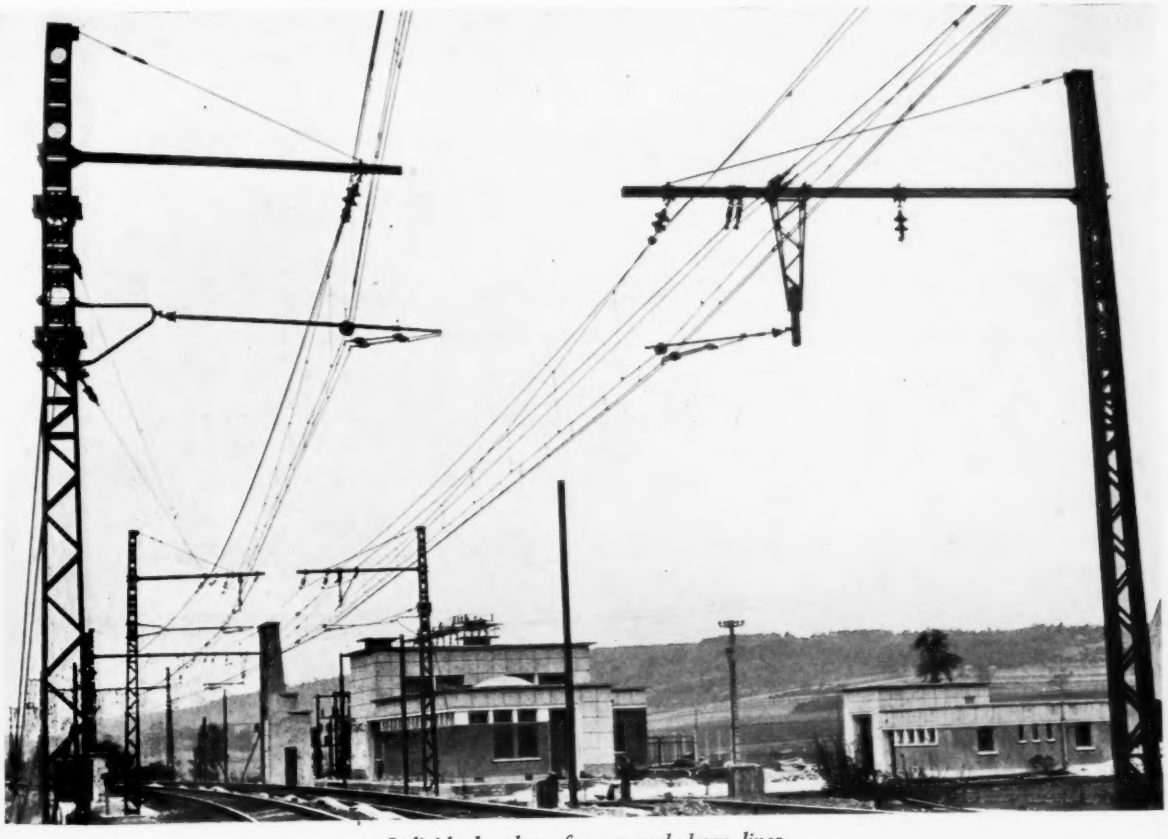
Erection of catenary on gantry-type supports and fitting of stringers

Four cables have been laid in trenches along the line. Two cables are for S.N.C.F. long-distance communications and postal services with Lyons and the south of France, each circuit carrying 24 voice-frequency channels. A

(*Continued on page* 110)

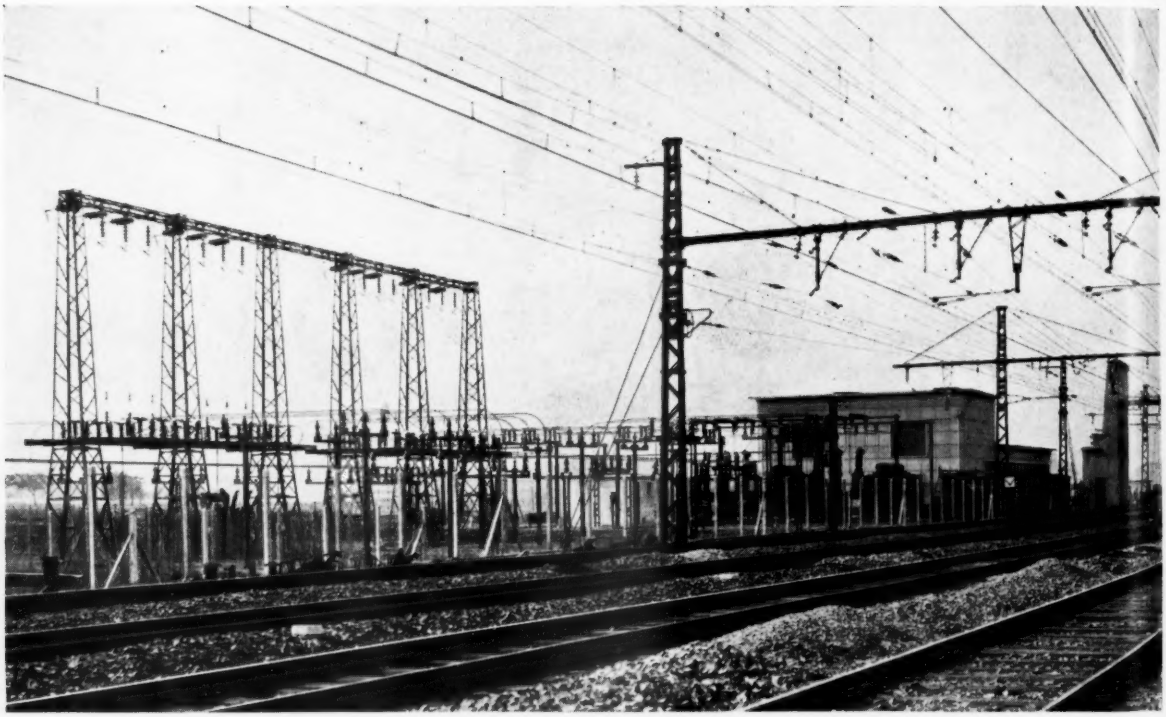
Electrification from Laroche to Dijon Inaugurated

Independent pylons for four-track section through Darcey Station

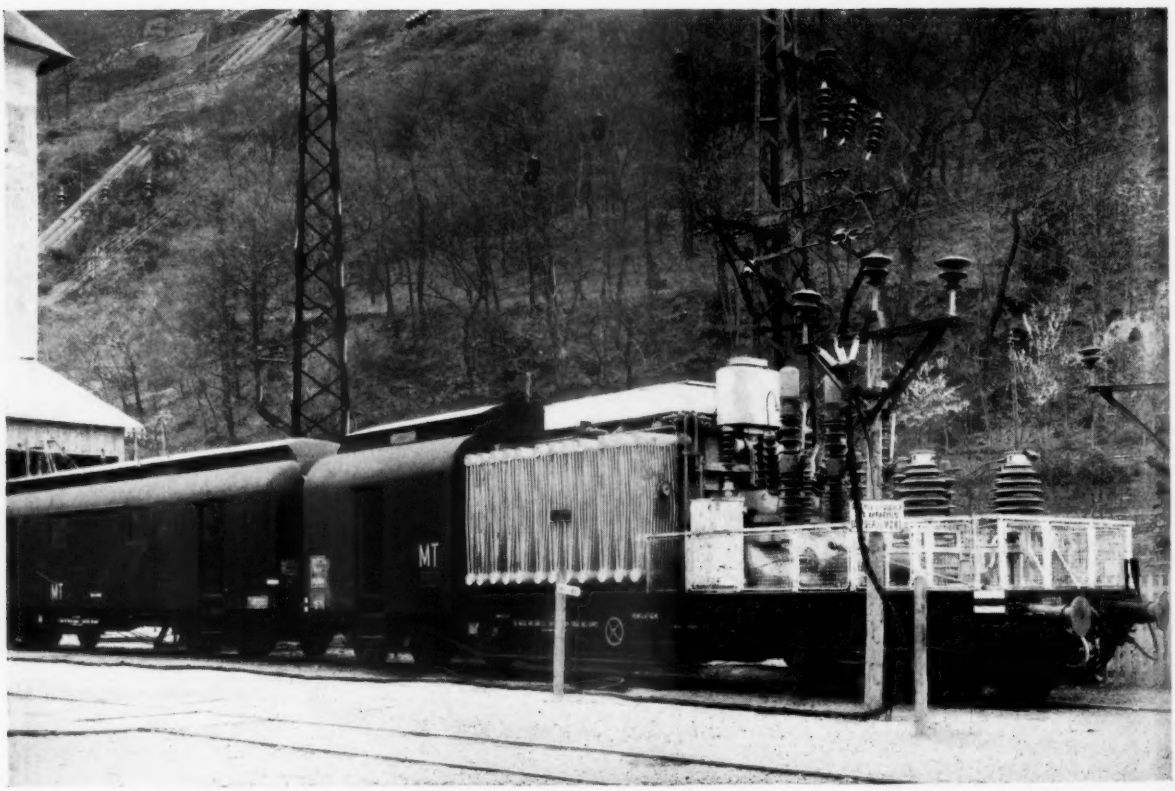


Individual pylons for up and down lines

Electrification from Laroche to Dijon Inaugurated



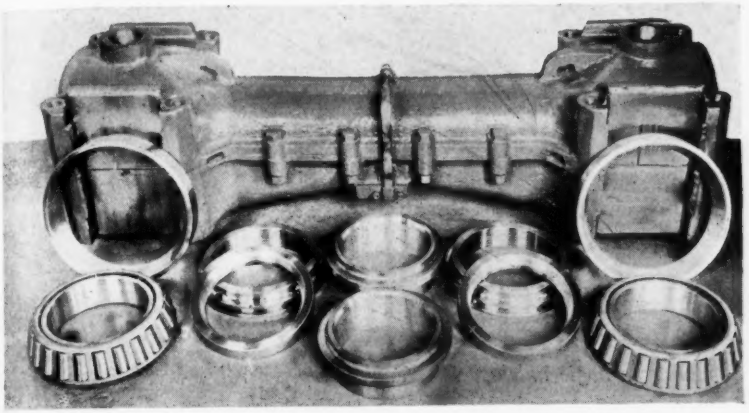
Substation at St. Florentin



Mobile substation for emergency use

Roller Bearings for Pacific Locomotives

Cannon type axleboxes having high inherent stability combined with great rigidity



Timken tapered roller bearing details, as fitted to Class "A1" Pacific locomotives

FIVE Class "A1" 4-6-2 locomotives, technical details of which were given in our issue of August 27, 1948, were constructed at Doncaster to the design of Mr. A. H. Peppercorn, Chief Mechanical Engineer, British Railways, Eastern & North Eastern Regions, and have recently been placed in service. These locomotives are fitted with Timken tapered roller bearing axleboxes.

The bogie is equipped with two Timken cannon type axleboxes, a design in which two Timken bearings are mounted in a continuous tubular split cast-steel housing. As will be seen from one of the illustrations, the design employs one bearing at each journal and the cast-steel housing is held together by fitted taper bolts. The complete cannon box assembly forms a self-contained unit having high inherent stability combined with great rigidity; this design also offers advantages over two independent type boxes since the stability of the mounting reduces the effects of extraneous loads applied to the axleboxes.

The tapered construction of the Timken bearing, which combines the advantages of true rolling motion and full line contact, permits the handling of any combination of radial and thrust loads imposed by the bogie frame structure and the wheel set. The inner races of the bearings are a heavy press fit on the axle and take their abutment through a ring on to the axle shoulder; the outer races are a close fit in the bore of the housing and correct bearing end-play is regulated at assembly by split adjustment rings. The bearings run in a high-capacity oil sump, and self-circulating movement of the oil is set up by the tapered construction of the bearing. Only two seals are required with this design of axlebox, and these are of the non-rubbing type combined with oil flingers on the enclosure sleeve.

Bearing and axle inspection is accomplished by splitting the cannon box, but this is rarely required, as the design is evolved for high availability and minimum maintenance.

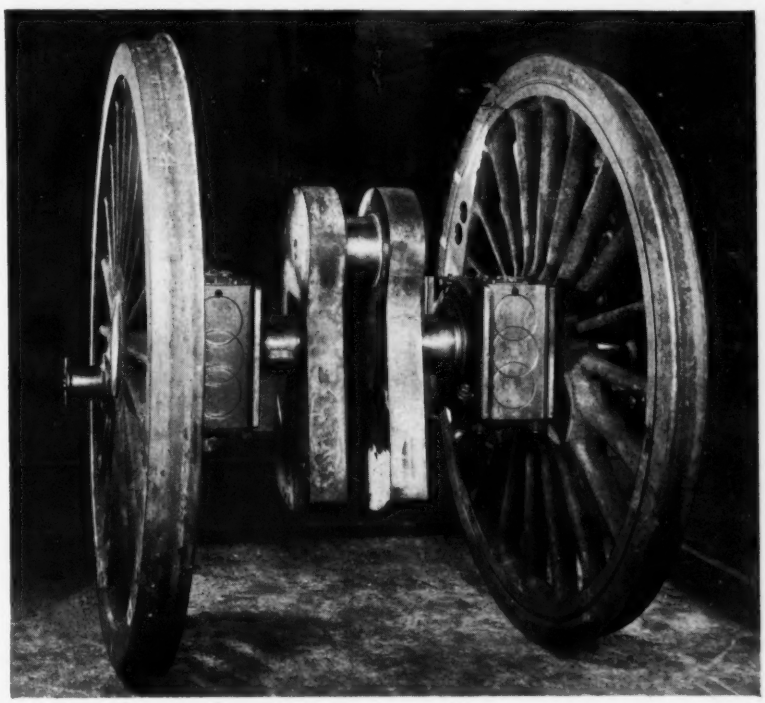
Coupled Axleboxes

The intermediate and trailing axles are fitted with cannon type boxes incorporating similar design features to those of the bogie. In common with all axleboxes fitted to these locomotives, these cannon boxes are fitted with a British Timken patented condensing vent, which permits the axleboxes to breathe freely and also prevents condensation of steam laden atmosphere inside the axleboxes.

The leading axle is arranged to take the drive from the middle cylinder and incorporates a single-throw crank. In this application two independent axleboxes are used, each axlebox incorporating two Timken bearings separated axially by spacers. The bearing arrangement in which the large ends of the tapered rolls are pointing outwards gives high stability and freedom from tilting in the bearing assembly. The bearings are mounted in a cast-steel housing split horizontally to facilitate assembly, the halves being secured by fitted bolts. In order to accommodate a measure of axle flexure these axleboxes are fitted with trunnion guides.

This feature allows alignment of the axlebox as a unit with the axle under all load conditions; at the same time it ensures that the bearings remain undisturbed in the ideal condition of full line contact.

The radial axleboxes on the trailing pair of carrying wheels are of the Cartazzi pattern designed to allow a side movement of 3 in. per box. These



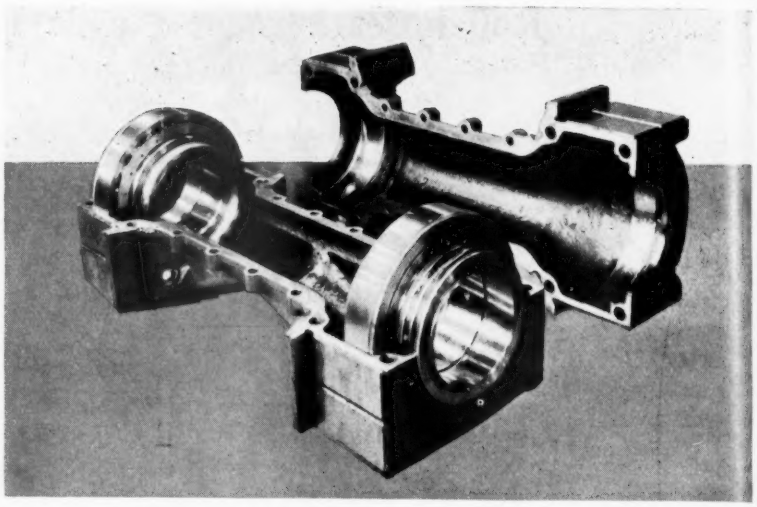
Typical axlebox assembly of driving axle

axleboxes incorporate two bearings mounted with the large ends of the rolls pointing outwards and widely spaced to give high resistance to tilting such as tends to occur under off-centre loading conditions set up when rounding curves.

Following normal accepted railway practice used in mounting wheels, the bearings are a heavy press-fit on the axle. Bearing spacers are used for adjustment to obtain correct initial end play of the whole assembly which is secured against the axle abutment by an axle locknut.

The bearings are mounted in a one-piece steel casting and the bearing outer races are a close fit in the bore; inspection is carried out by removing the back cover securing nuts and withdrawing the axlebox body from the bearings which are left undisturbed on the axle. In common with all axleboxes on this locomotive, the vertical guide faces are fitted with ground manganese-steel liners to give utmost resistance to wear in service.

The tender axleboxes follow the standard Timken design of outside journal axlebox and are fitted with a dual inner race bearing pressed directly on the axle. This compact design of bearing does not require any axle locking device and is easily adjusted as required by shims positioned at the back cover. The axlebox is mounted as a complete unit, and inspection is made by withdrawing the axlebox body, while for tyre turning only removal of the inspection plate is required.



Cannon type bogie axlebox with Timken tapered roller bearings assembled in cast steel housing

Belgian Railways First Electric Locomotive

(*Concluded from page* 103)

by a 3·5-kW. generator coupled to one of the blower motors. The same battery of cadmium-nickel cells is used for lighting the locomotive, but heating current is taken at high tension from the equipment side of the high-speed circuit-breaker. The electrical apparatus is generally similar to that of the 1935 Brussels-Antwerp motor coaches, except that acceleration is not automatic and the main circuit-breaker used in those vehicles has been replaced by a high-speed pattern similar to breakers in the railway sub-stations.

High-tension auxiliaries comprise two motor-blower units and two compressors all with 3,000 V. motors. The compressors supply the locomotive and train brakes as well as the pneumatic system for the contactors. Hand brakes are fitted also, and all wheels are sanded.

Automatic means are provided of cutting off the motor current during severe brake applications without tripping the main circuit-breaker, and of preventing closing of the motor circuits when the brakes are hard on. The control system includes a dead man's handle which when released trips the circuit-breaker and initiates a brake application.

Operation of any of the safety devices mentioned is signalled by the lighting of a lamp in the cab. Two locomotives can be coupled together and controlled from one driving position when necessary.

The mechanical parts of the locomotive were built by S. A. Baume et Marpent, and the electrical equipment by A.C.E.C. (Charleroi) and S.E.M. (Ghent). Twenty of the class have been ordered for passenger and goods services.

Electrification from Laroche to Dijon Inaugurated

(*Concluded from page* 106)

third auxiliary cable serves the numerous S.N.C.F. installations along the line, and a fourth cable is for medium-distance postal services. Inductances to compensate for the self-capacity of the cables are provided at intervals of 2,000 yd., except in the auxiliary. The 24-channel cables have repeater stations every 12½ miles, while on the others they are at approximately 37-mile intervals. Paris, Dijon, and Lyons are terminal points.

Express traffic over the whole of the Paris-Lyons line will be accelerated when electrification is completed. Elimination of the stop at Laroche and a shorter stop at Dijon will contribute to the saving of time. Ultimately one or two hours may be gained in the journey from Paris to Nice. The capacity of the line will be greatly increased, especially for goods traffic. (A description of the technical improvements incorporated in the Bo-Bo mixed traffic and 2-Do-2 express locomotives that will work the line appeared in *The Railway Gazette* of July 15, 1949.)

The annual saving of coal is estimated at 600,000 tons. The 400,000,000 kWh. required for the fully electrified line ultimately will be supplied mainly by the new hydro-electric station at Genissiat, on the Rhone, the figure quoted representing approximately the proportion of the total output (25 per cent.) allotted to the S.N.C.F. Experiments with a less costly form of fixed installation utilising the proposed single-phase 20,000 volt system may be undertaken later on feeder lines (see *The Railway Gazette* of June 17, 1949).

B.T.C. ACQUIRES ANOTHER BUS COMPANY.—The British Transport Commission has acquired the business of the Ebor Bus Co. Ltd., operating services in the neighbourhood of Mansfield. These are being transferred to the Mansfield District Traction Company, which the B.T.C. took over from the British Electricity Authority.

G.N.R.(I.): EMPLOYMENT ISSUE DISCUSSED.—A deputation comprising the standing committee of the railway trade unions, was received on January 12 by Mr. Norton, Minister for Social Welfare, and the approach made by Mr. G. B. Howden, General Manager of the Great Northern Railway (Ireland), on the possible effects of the cancellation of the certificate of exemption from unemployment insurance of about 1,100 members of the staff, was discussed. The Minister said that, according to a trade union statement, the legal position was that the company need not apply for a continuation of the operation of the certificate of exemption, and, in the absence of such an application, the Minister could not grant the certificate. The deputation said, however, that whatever the legal position, the action of the company was disturbing, as it indicated its intention of creating a much larger pool from which staff could be dismissed on short notice. The Minister promised to have the matter further examined.

RAILWAY NEWS SECTION

PERSONAL

Mr. C. W. Clarke, an Assistant Commissioner of the Western Australian Government Railways, has been visiting Great Britain to finalise the design of "W" class 4-8-2 locomotives which are to be built in this country. He recently left for Australia. Mr. J. Bradley, until recently Acting Chief Mechanical Engineer of the Madras & Southern Mahratta Railway, has been appointed Assistant Chief Mechanical Engineer of the Western Australian Government Railways; and Mr. J. Hannah, M.B.E., has been appointed Inspecting Engineer for the Western Australian Government Railways in the United Kingdom, attached to the staff of the Agent-General for Western Australia.

Mr. M. E. F. Gaveau has been appointed Secretary of French Railways Limited, London, in succession to Mr. H. J. B. Taine, who relinquishes that post to take up another appointment in the travel industry. In addition to the Secretaryship of the company, Mr. Gaveau will be in control of its Freight Department.

Mr. Carmelo Adolfo Pizzorno, General Manager of the Patagonian National Railway, has been appointed General Manager of the General Mitre (former Central Argentine) Railway, succeeding Mr. Roberto Iglesias, who, as already recorded, has been appointed Under-Secretary for Merchant Marine in the Argentine Ministry of Transport.

Mr. W. H. Harrison has been appointed a Director of the British Aluminium Co. Ltd.

Mr. J. R. Pike, M.Inst.T., Chief Officer (Goods), Railway Executive, who, as recorded in our January 13 issue, has been appointed Chief Rates & Charges Officer, joined the L.N.W.R. in 1914. After service with the R.N.V.R. from 1916 to 1919, he returned to railway duties, and in 1931 he became Personal Assistant to the Vice-President of the L.M.S.R. Two years later he was made Assistant District Goods & Passenger Manager, Leicester, and, in 1935, Assistant (Research) to the Chief Commercial Manager. He became Assistant Chief Commercial Manager in 1946, and left that position on his appointment to the Railway Executive as Chief Officer (Goods) on January 1, 1948. Mr. Pike has recently been appointed a member of the Charges Committee of the British Transport Commission, and is Chairman of the Executive Freight Charges Committee. He has also been Chairman of the Irish & English Traffic Conference for the past five years.

Mr. W. H. Mortlock, Senior Assistant to the Regional Accountant, Eastern & North Eastern Regions, British Railways, has retired. Recently he was invited to meet the departmental accountants, and colleagues from the Railway and other Executives, who, under the chairmanship of the Accountant, Eastern and North Eastern Regions, Mr. F. H. Sedgwick, paid tribute to Mr. Mortlock and presented him with a coffee table.

Mr. H. H. Phillips, A.C.I.S. M.Inst.T., Assistant Chief Regional Officer, Western Region, British Railways, who, as recorded in our January 13 issue, has been appointed Chief Commercial Officer to the Railway Executive, joined the Great Western Railway in 1908, and was a member of the General Manager's personal staff until 1932; for some years he was in charge of the section dealing with rates and fares, docks, marine and general subjects. In 1932 he was transferred to the Office of the Superintendent of the Line to reorganise excursion and cheap ticket facilities. At the end of 1937 he became Assistant Divisional Superintendent, and, in 1941, Divisional Superintendent, Cardiff. During the period of the war he was a member of the Cardiff and Barry Port Emergency Committees. In 1946 Mr. Phillips was appointed Assistant to the Superintendent of the Line, stationed at Cardiff, and, in 1948, became Assistant Chief Regional Officer, Western Region.

We regret to record the death on January 19, at the age of 71, of Alderman William Dobbie, C.B.E., M.P., President of the N.U.R., 1925-28 and 1930-33.

Mr. J. R. Pike
Appointed Chief Rates & Charges Officer, Railway Executive

Mr. H. H. Phillips
Appointed Chief Commercial Officer, Railway Executive

Mr. Cesare Lucchini
Appointed President of the General Management, Swiss Federal Railways

Mr. Cesare Lucchini, General Manager (Engineering & Operating), Swiss Federal Railways, who was recently appointed President of the General Management, was born at Arasio di Montagnola (Ticino) on July 20, 1885. He studied at technical high school from 1904 to 1908, and took a diploma as civil engineer. In 1908 he entered the service of the former Gotthard Railway, for the doubling of various lines, and from January, 1913, to November, 1914, was in charge of widening works at Chiasso Station. From December, 1914, to the end of 1915, he was a military engineer engaged on the Murten and Bellinzona fortifications; and from 1916 to 1918 he was Engineer at the Ritom power station works; from September, 1918, he was responsible for the cable railway, pipe line and approaches to the Ritom generating station itself. In 1922 Mr. Lucchini became Deputy Engineer of the Barberine power station works. He was Chief of the Electrification Department offices at Olten from 1923 to 1926, and then Deputy Chief Engineer at the head offices, of the Federal Railways. He was appointed Chief Engineer of No. 2 Region of the Federal Railways in 1930, and at the end of 1938 became Manager of that region. He was appointed General Manager (Engineering & Operating) in 1947.

Mr. J. E. M. Roberts, who, as recorded in our January 13 issue, has been appointed Executive Officer (Rates & Charges) to the Railway Executive, joined the L.N.E.R. in 1929, and after experience in various departments became Chief Staff Clerk in the Divisional General Manager's Office of its North Eastern Area. In 1939 he became Assistant District Superintendent, York; in 1941, District Superintendent, Sunderland; and in 1943, District Superintendent, Darlington. In the next year he was made Assistant Divisional General Manager, and, in 1947, Passenger Manager, of the North Eastern Area. He was a Director of various bus companies until March, 1949, when he became Assistant Commercial Superintendent for the Southern Region of British Railways, but was shortly afterwards transferred temporarily to the Railway Executive.

Mr. Frank Grundy, M.Inst.T., formerly Assistant Commercial Superintendent (Goods), London Midland Region, who, as recorded in our January 13 issue, has been appointed Executive Officer (Goods) to the Railway Executive, joined the Lancashire & Yorkshire Railway at Bury in 1915. He served in the R.N.V.R. from 1917 to 1919, and, after returning to railway service, received training at stations and district offices, and then joined the Chief Goods Manager's staff at Euston in 1925. He became Goods Agent at Accrington in 1938, at Bury, in 1939, and (after occupying posts at Bolton and Euston) at St. Pancras & Somers Town in 1943. He was appointed Assistant to Chief Commercial Manager (Goods) in 1944; District Goods Manager, Wolverhampton, in 1945; and Assistant Chief Commercial Manager (Goods) in 1946.

Mr. J. E. M. Roberts
Appointed Executive Officer (Rates & Charges), Railway Executive

Mr. F. Grundy
Appointed Executive Officer (Goods), Railway Executive

Mr. E. Morgan
Appointed Senior Research Engineer, London Midland Region, British Railways

During the recent war Mr. Grundy's services were lent for a time to the Ministry of Food, where he served as an Assistant Director of Transport and Deputy Divisional Food Officer (North West), and was responsible for transport and warehousing.

Mr. E. Morgan, B.Sc., who, as recorded in our January 20 issue, has been appointed Senior Research Engineer, London Midland Region, British Railways, as from February 1, joined the Research Department of the L.M.S.R. at Euston in the Engineering Section in 1933. He became deputy to Lighting & Heating Assistant in 1936, and in 1945 succeeded to the position of Lighting & Heating Assistant to the Chief Civil Engineer. Mr. Morgan is Railway Executive representative on various British Standards Institution committees; British Railways representative on the National Illumination Council; Chairman of the informal sub-committee of the Railway Executive Civil Engineers' Committee on Lighting, Heating & Ventilation Matters; and a member of the Railway Executive Joint Policy Committee of the Civil & Mechanical Engineers. He has contributed articles to various scientific journals, and has taken a leading part in fuel conferences under the auspices of the Ministry of Fuel. Mr. Morgan graduated B.Sc. with first class honours in Mathematics at Sheffield University in 1928, and carried out research on fuel in conjunction with the Safety in Mines Research Board between 1928 and 1933, during which time he was Senior Research Fellow (1929-32), and Robert Styring Research Fellow (1932-33).

We regret to record the death on January 21, at the age of 65, of Mr. N. B. Walton, C.B.E., Executive Vice-President of Canadian National Railways.

Brigadier L. F. S. Dawes, lately Secretary, Southern Railway Company, has been appointed Secretary to the newly-formed Engineering Equipment Users Association (see also paragraph on page 119).

East African Railways & Harbours

Mr. J. W. Terrington, Assistant Superintendent (Operating), and Mr. W. L. W. Freeman, District Traffic Superintendent, East African Railways & Harbours, retired recently. Mr. J. M. Kesson, Assistant Engineer, has been promoted District Engineer, Mombasa.

We regret to record the death, at the age of 57, of Mr. Mohammad Nizamuddin, Director General of Railways, Government of Pakistan. Mr. Nizamuddin's previous appointments had included those of Chief Government Inspector of Indian Railways at Bombay, and General Manager of the Nizam's State Railway. He went to Pakistan in 1947, and retired from railway service early in 1948, but was re-employed by the Government as Director-General of Railways later in the same year.

British Railways Appointments

The Railway Executive announces that, with the concurrence of the British Transport Commission, Mr. W. J. Manclark, Assistant Stores Superintendent, London Midland Region, has been appointed Fuel Purchasing Officer under the Chief Officer (Stores), Railway Executive Headquarters.

Mr. J. W. Terry, Assistant Stores Superintendent, Southern Region, has been appointed Acting Stores Superintendent of that Region.

Another British Railways Steamer Launched

Intended for the Harwich-Hook of Holland service

A new ship for the Harwich-Hook of Holland night service, S.S. *Amsterdam*, was launched from the yard of John Brown & Co. Ltd., Clydebank, on January 19. The naming ceremony was performed by Mrs. den Hollander, wife of the President of the Netherlands Railways. The keel was laid on March 1, 1949, and the *Amsterdam* is expected to be completed in time for the 1950 summer service.

She is a twin-screw geared turbine steamer of 377 ft. overall length, 52 ft. breadth, and 27 ft. depth, with a gross tonnage of 5,000. Her machinery of 12,500 s.h.p. will give her a speed in service of 21½ knots. Sleeping accommodation is provided for 321 first and 236 second class passengers, with ample space for cargo and motorcars.

Special features include mechanical ventilation and air heating with individual control in cabins; Grinnell automatic sprinklers in passenger and crew accommodation and in motorcar space, with a water and steam drenching system to cargo holds, baggage spaces, and so on; and radar and Decca navigator, echo sounding apparatus, magnetic repeater-type compass, and a public address system.

The toast of "The ship and her owners" was proposed at a luncheon after the launch by Lord Aberconway, Chairman of John Brown & Co. Ltd., and Mr. Eric Mensforth, another director, presented a brooch to Mrs. den Hollander.

Replying to the toast, Mr. V. M. Barrington-Ward, Member of the Railway Executive, said that the *Amsterdam* was the first ship launched to an order placed by the Railway Executive since nationalisation, and she would add to the prestige and profits of the marine department of British Railways. This was the third vessel to be named *Amsterdam* and the eleventh to be launched at Clydebank for the Harwich-Hook service. Although there were still gaps in the British railways fleet, the high cost of shipbuilding was an obstacle to placing new orders.

Dr. J. M. M'Neill, Managing Director of John Brown & Co. Ltd., referred to the part played in two wars by ships of the Harwich-Hook service built at Clydebank. John Brown had built over 50 ships for the various British railways in the past. A pleasant feature of the launch of the *Amsterdam* was that his firm was to lay down in the same berth another keel for British Railways, that of a diesel train ferry for the Harwich-Zeebrugge service.

Others present at the ceremony were: Messrs. F. Q. den Hollander, President of the Netherlands Railways, O. H. Corble, Chief Officer (Marine), Railway Executive, J. L. Harrington, Chief Officer (Administration), R. H. Hacker, Chief Officer (Continental), T. F. Cameron, Chief Regional Officer, Scottish Region, British Railways, L. H. K. Neil, Continental Traffic Manager, Eastern and North Eastern Regions, Captains R. Davis, Marine Superintendent (Parkeston), Eastern Region, W. S. Dawson, Superintendent Engineer (Parkeston), C. R. Baxter, Master-designate of the *Amsterdam*, and Messrs. M. B. Thomas, Public Relations & Publicity Officer, Eastern Region, and J. W. Beck, Secretary, John Brown & Co. Ltd.

Coal Output in 1950.—Lord Hyndley, Chairman of the National Coal Board, stated on January 17 that a realistic forecast of deep-mined coal output in Britain this year might be 205 million to 210 million tons; production for 1949 was 202,700,000 tons. There would be no change, he said, in the policy of selling coal abroad above inland prices unless the Government so directed. The export target for the current year Lord Hyndley put at somewhat over 22 million tons (including 5 million tons for bunkers), or 3 million tons over last year.

Left to right: Messrs. John Elliot, Chief Regional Officer, L.M.R.; F. Q. den Hollander, President, Netherlands Railways; Mrs. Barrington-Ward; Mr. H. S. Turrell, Stationmaster, Euston; Mrs. den Hollander; Messrs. J. W. Watkins, Operating Superintendent, L.M.R.; V. M. Barrington-Ward, Member, Railway Executive; A. E. Hammett, Commercial Superintendent, L.M.R.

Proposed Increase in Freight Charges

Conclusion of evidence before the Charges Consultative Committee on the application by the B.T.C. for increased railway charges

On January 18, members of the Transport Tribunal, sitting as a Consultative Committee, continued their hearing of the application by the B.T.C. for an increase in railway rates and charges for merchandise by goods and passenger train, and in dock and canal charges.

Mr. W. J. Diplock, K.C., in continuing his case for the N.C.B., gave figures of the increase in the price of coal over the last few years. There had been, he said, a total flat-rate increase of 25s. 11d. a ton to January 1, 1948, and since that date there had been no general increase, though there had been certain adjustments as between prices of different categories.

In 1948 and 1949, certain adjustments were made, and the lower categories of coal were reduced by as much as 15s. a ton, and the higher categories were increased in price about 3s. a ton. It was that adjustment which accounted for the evidence which was given for the Coal Board of an increase in the cost of coal to the railways of from 175 or 180 per cent. between 1948 and 1949. The N.C.B. would be unable to absorb the additional £10 million which the transport of coal would cost.

Price of Coal for Export

Its ability to make a profit in 1948 and 1949 was dependent on its ability to export coal at the high world export prices existing at present and which were considerably higher than the prices for coal for inland consumption. If it had not been for the export price, which varied from nothing to £1 over inland prices in 1948, they would in that year have been working at a substantial loss. There would have been a deficit instead of a small profit, and a somewhat similar position operated today. It was in the national interest that everything should be done to keep down the f.o.b. price of coal for export, quite apart from the inland price.

Mr. H. R. Askew, for the Gas Council, said that the estimated tonnage of coal to be used by the whole gas industry in the year ending April next would be 17,000,000 tons rail-borne, 500,000 tons canal-borne, and 8,000,000 tons sea-borne. The burden these proposals would put on the gas industry was just over £2,000,000 a year, and that was only in respect of gas, coal, oil, and coke, and contained no element of increased freight charges for such things as pipes and refractories used by the industry.

The Commission was then adjourned until January 19, when Mr. E. S. Fay put the case for the British Electricity Authority, which, he said, would suffer an estimated loss of £1,750,000 in the year if the proposed increases were made.

It had been suggested, he said, that industries and nationalised authorities should absorb the increases so that they would not be passed to the consumer, but there was no power of absorption and there were no shareholders to take the shock. They had seen that the B.E.A. had made a surplus of £4 million, but the £4 million could only be used for one matter in the long run, and that was the relieving of demands on the consumer.

If there was a surplus it was, presumably, to be put to reserve or carried forward, but what was the purpose of that reserve? It was to cushion charges in some future years; and the plain fact was that, reserve or no reserve, the B.E.A. was going to be £1,750,000 worse off if these charges are increased.

It had been stated for the railways that if the charges went up they expected to lose coal traffic involving £2 million worth of receipts. But if there was no diversion—and he asked that the evidence of the experts on this point be accepted—it meant that the railways would be £2 million better off than they had budgeted for. This amount would afford them a legitimate 3 per cent. differential. Emphasising that the B.E.A. was not seeking any undue preference, Mr. Fay said that coal was a substantial block of traffic which was a fit subject for separate treatment.

Mr. Fay commented that, taking the long-term view of the coal for B.E.A. stations, there was a risk that there might be in the future a considerable diversion of traffic, through the project for establishing generating stations close to the coalfields and the transmission of current to the load centres by grid. No decision had been taken, but the matter was being studied, and it would be a serious matter for the railways. "Any increase in railway rates would be a factor tending to support the proposition that there should be transmission of electric current over distances by grid."

Mr. B. McKenna, speaking on behalf of the British Federation of Wholesale Traders and the Society of Motor Manufacturers & Traders, said they did not agree that the revenue of the B.T.C. taken as a whole would decline this year and next year. Their budget should balance by 1952. An increase in rates would run directly counter to the present policy of maintaining stability of wages and prices.

The B.T.C. had vast road interests in its hands already, the receipts from which were buried in the figures under other principal activities, the gross receipts of which for 1949 were £153 million. A very large part of that figure must be derived from provincial and Scottish road passenger services owned by the B.T.C. There must also be large contributions from road haulage companies wholly owned by the B.T.C., and from interests in non controlled undertakings.

Mr. G. A. Baxter, for the National Farmers' Union, said that if the Freight Bill for farmers was affected by this proposal, the increase to the farmers would be about £1,500,000 a year. That was in respect of purchases of raw materials. The farmers, unlike the N.C.B. and others, could not pass increased transport charges to the consumer, because farmers were subject to these regulations.

Closing Speech for the B.T.C.

Mr. Lionel Heald, K.C., made his closing speech for the British Transport Commission on January 20, emphasising that there was general agreement as to the background from the economic point of view. There had been a tendency shown in this Committee, however, to ignore particularly the fact that transport as a vital necessity must be paid for. It was not really a solution for one person "to pass the buck" to another.

There was also a tendency to say: "Well, we will have to say that we shall have to go along to the Ministry of Supply, or the Ministry of Food, or the Ministry of Agriculture, or somewhere, and they will decide whether the prices are to go up or not." It was not the moment now, however, to discuss those economic questions, but it was important that there should be more of a sense of reality about it than was sometimes shown. It was a question of how far we could afford such necessities as transport, and they could not have them unless they were paid for. The fundamental question that must be before their minds was, first, whether the general approach of the B.T.C. to the problem—its general diagnosis of the situation—was wrong?

Mr. Heald said that there had been a general measure of support for the B.T.C. diagnosis of the present situation and he asked the Committee to say he was right in suggesting that the only practical course was to have an increased revenue. The suggestion had been made that the railways should call attention to uneconomic working, but it was important that the public should not be left with any possible feeling that those concerned with the operation and direction of the railways were not doing their very best in the circumstances.

He pointed out that the increases were designed to raise additional revenue of £27·5 million against an estimated deficit of £30 million. Suggestions had been made that road haulage should provide additional revenue, but even if this amounted to £2·5 million it would only cover the deficit. He could not agree that there would be no fall in passenger revenue.

Then another background point was the question of inflation. It was an interesting fact that that was not mentioned by anyone in these proceedings and it did not occur in the cross-examination of Mr. Wilson at all. It seemed to him to be a thing about which a great deal could be said, and was said, and it was rather a mistake to talk about it in relation to the Transport Commission and its application under the Transport Act. Assuming—and he must for the moment assume—that their application was in other ways absolutely justified, they were justified in saying that there would be those great deficits, and growing deficits, accumulating, and they at the present time had a 55 per cent. increase in maximum charging powers above pre-war. It seemed rather fantastic in those circumstances to accuse the B.T.C. of starting up an inflationary spiral when, to put it at the lowest, it was merely people coming in at the end of the queue under the orders of Parliament.

The idea that they could suddenly sack 50,000 men overnight and carry on giving people the service on the railways they wanted was fantastic. "There seem to be some people here," said Mr. Heald, "who approach the question in that way, apart from the people who write anonymous letters to the newspapers. We say, quite definitely, we are doing more work with fewer men than in 1938."

Mr. Heald justified the increase in staff compared with pre-war by saying that arrears of maintenance were being overtaken, more locomotives and wagons were being produced, and a greater volume of other work was being undertaken. The average length of journey or haul had also increased, and this was an important factor which had been overlooked.

Mr. Heald said that the representatives of other nationalised industries had attempted to make out a case for a differentiation in charges for various freight

classes. The advice they tendered to the Committee was that they could not supply at the present time the necessary data for a comparison to be made. "If you try to arrive at some conclusion now, on the advice tendered by the objectors you are going to arrive, in our view, at an unsatisfactory result."

Nobody would say that anyone wanted to put a penny on the cost of anything at this time; he would suggest, however, that there had been rather a tendency to overstate the position. For example, if one took the iron and steel position, the suggestion there that it would be inevitable that there should be an increase in the cost of steel equivalent to the increase in the cost of transport was something which was just not the fact, because that would be a matter for the Minister of Supply; nothing could be done in that way without his agreement.

If the position was as serious, and the danger as great, as had been suggested, they were entitled at any rate to ask themselves: "Would the Minister of Supply justify, or consider justified, that increase, or would he say, having regard to the facts as we know them, that the steel industry is not in a state of destitution?"

On claims for differential rates for coal traffic, he stated that necessary data for a comparison could not be supplied at the present time, and this matter should be left until the main new charges scheme was being prepared.

Transport Anomalies

On the first day of the inquiry, it was disclosed by Mr. R. H. Wilson, Comptroller of the British Transport Commission, that there was "a scheme on the stocks" for equalising and removing transport anomalies in the London area, and a reference was again made to the subject by Mr. David Blee, Member of the Railway Executive, when recalled before the Committee.

Asked by Sir William Bruce Thomas, Chairman of the Committee, for his further views on the effect of an increase on ordinary passenger fares, Mr. Blee said that he would view any such increase with the utmost alarm in terms of gross receipts. They had a certain amount of experience immediately behind them in this matter, and they would know from the figures already given that stripping the 1947 passenger receipts of the effect of the increase for the last three months of the year—they would remember the figure was £115,000,000, and it was thus reduced to £112,000,000—it was significant to look at that figure of £112,000,000 side by side with the actual passenger receipts of 1949, actual in terms of the final estimated figures. Those final estimated figures were £113·8 millions.

What had happened in the interim about any increase? There had been an increase of 16¼ per cent. on the ordinary fares; they had been lifted from 33⅓ per cent. to 55 per cent.; and there had been an increase of 24 per cent. on workmen's and season tickets; they had been lifted from 25 per cent. to 50 per cent. Yet in so short a space of time the actual gross receipts were still about the same. It could be argued, and quite fairly, that in that result was a rapidly diminishing element of Forces travel, and that was of more moment in producing that rather striking and depressing result than the incidence of the ordinary public traffic. When one looked at that for a moment one saw the results in fact did produce an increase in receipts from ordinary public traffic of £8·6 millions.

The Chairman pointed out that Mr. Blee had spoken of this matter as one of urgency, and had expressed the hope that revision might be effective by next October. They would no doubt bear in mind that when the scheme was deposited it had to be advertised, and those entitled to be heard would require some time. The gap between the advertisements appearing and the hearing might be substantial.

"London passenger fares form a troublesome subject. This is likely to take some little time, and I imagine that when the whole thing is settled, the London Transport Executive will not be able to bring it into operation next day."

When Mr. Wilson was recalled the Chairman asked him when he thought the task of the B.T.C.—a properly integrated system of transport for passengers and goods—might be achieved.

Mr. Wilson replied: "I believe it will be at least ten years before you will have the integration envisaged in the Transport Act. One would have hoped—and these are hopes and not facts—that towards the end of that ten-year period one would really be beginning to make progress. I do not know whether you have been troubled by a suggestion that when this integration has been completed transport will become exceedingly cheap; if that is so, one is expecting an enormous thing from integration."

With their costs running at 125 per cent. above the pre-war level, if their charges were kept down to 81 per cent., they would see what great economies would have to be made in a year. They would amount to something like £45,000,000 a year.

This—the eleventh day—completed the hearing in connection with rail and canal charges. The Committee will sit again on February 7 to consider the application regarding dock dues.

British Electric Traction Orders, 1949

Review of Metropolitan-Vickers progress

In the report issued by the Metropolitan-Vickers Electrical Co. Ltd. on progress made in 1949, after referring briefly to the building of the new British Railways gas turbine unit, it is stated that last year British Railways placed an order for the electrical equipments for 27 six-axle mixed-traffic locomotives of the double-bogie type. Each equipment will have six motors, totalling 2,500 h.p., and will be arranged for regenerative braking. These locomotives, together with 58 four-axle locomotives, the equipments for which are now being made, are for use on the Manchester-Sheffield-Wath electrification.

An order has been received for 14 sets of electrical equipment for four-axle locomotives from Rede Mineira de Viacao. These are for operating on 3,000 V. and the rating of each locomotive will be approximately 1,070 h.p. They are arranged for rheostatic braking. The South African Railways have ordered ten four-axle shunting locomotives of 1,200 h.p., 3,000 V., which brings the total number of locomotives supplied or on order to the South African Railways to 210. Delivery has proceeded, also, on the 20 sets of electrical equipment for 3,000-V. multiple-unit trains for the Central Railway of Brazil, these bringing the total supplied to this railway to 120 train units.

The Netherlands Railways have placed an order for 73 sets of fluorescent lighting equipment for use on steam-hauled railway coaches. These equipments will embody the Metropolitan-Vickers standard motor alternator set and will use the resonant starting circuit. Large-scale developments are planned for the various Indian railways and an order has been received for a sample fluorescent lighting set. Several sets are being sent to A.E.I. (India) for distribution to the various railways, and a similar scheme is in operation for Chile.

Three orders for heavy locomotives for mines have been received during the year. The Polish Mines Administration has ordered the electrical equipment for nine 120-ton, six-axle, 2,000-h.p., 2,700 V. locomotives, together with one 2,800-kW. rectifier substation. An order has been received from the Roan Antelope Copper Mines for two 1,500-V., 800-h.p. locomotives, and the equipment for one substation containing two 600-kW. mercury-arc rectifiers, overhead equipment, and signalling. New Consolidated Goldfields have ordered two 3,000-V. four-axle units.

The Mile End-Stratford re-signalling installation has been completed and the final section brought into service. Prior to this, two plants of a similar type had been put into service at Bow Junction and Mile End. This forms a three-mile section of four-track line equipped with automatic colour light signalling and power operated interlocking plants supplied by the company.

Hydraulic-operated rail brakes and automatic point operating equipment, together with the necessary control gear and colour-light signals, have been supplied for the Toton Up Yard, London Midland Region, British Railways, and rail brakes and control gear for the Whitemoor Down Yard, Eastern Region. The equipment at Whitemoor and one quarter of the Toton installation has been brought into service. New ground has been broken with an order from the Western Australian Railways for 24 sets of remote point operating equipment.

Development work has been proceeding on a new plug top for a.c. relays and several hundred of these are being manufactured for British Railways. In addition, a new and larger a.c. vane relay has been designed and manufactured and a new design of d.c. relay developed. It is expected that this will be in production early this year.

London Transport Executive has placed a repeat order for 66 dual-purpose motor generator sets for use on underground trains fitted with fluorescent lighting. The generator supplies d.c. for battery charging, control supply, and so on, and a.c. for fluorescent lighting.

MARSHALL AID FOR MACHINE TOOL SUPPLIES.—The Economic Co-operation Administration announced in London on January 24 approval for Marshall aid financing of up to £1,607,142 to pay for machine tools and equipment to be used in retooling the plant of the Ford Motor Company at Dagenham. Funds will be provided to buy needed tools and equipment in the U.S.A. and the company will pay the full price for the machinery in sterling. The part to be financed by E.C.A. is about 40 per cent. of the cost of the project. The majority of the new tools required will be produced in the United Kingdom and the Marshall aid dollars for tools now available only in the U.S.A.

Ministry of Transport Accident Report

Douglas Park (Fallside), Scottish Region, British Railways: May 26, 1949

Colonel R. J. Walker, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred at about 10.34 p.m. on May 26, 1949, at the Douglas Park (Fallside) signal box, Scottish Region, when the 10.10 p.m. express, Glasgow Central to London, composed of 14 bogie vehicles drawn by Class "7P" 4-6-2 engine No. 46230, approaching at about 30 m.p.h., found the home signal against it after passing the distant signal at clear and became derailed at the facing points leading to a refuge loop, the engine coming to a stand 56 yd. beyond. No one was injured and normal working on the line was resumed at 10.0 a.m. the following day.

At the time it was dusk, and the weather was fine and dry. The accompanying diagram shows the lines, signals and other details.

Signal No. 17 can be seen against the sky from Bothwell Junction, 1,138 yd. in rear, from the right-hand side of an engine, but only at 400 yd. from the left-hand. the main line under the train, between front and rear bogies of the brake van. The rear bogie of this and the front bogie of the following coach took the main line.

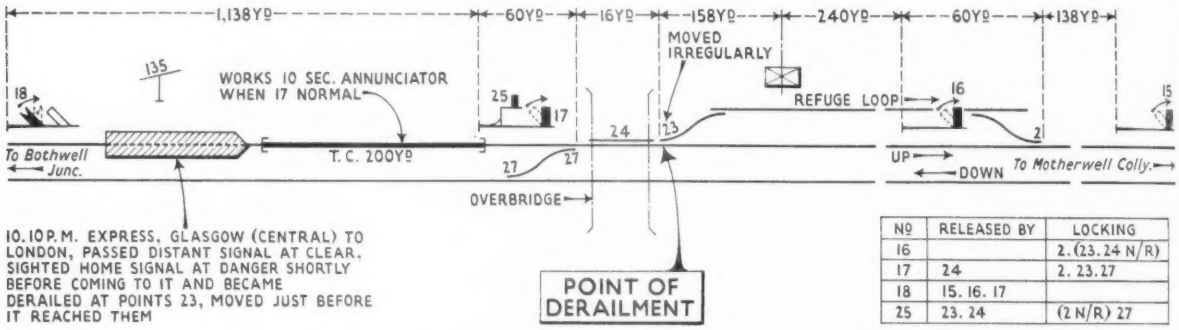
Evidence

The driver, who knew the road well, found the distant signal "off" for him, as other evidence positively confirmed, normally he could see the home signal at 400 yd. but steam and smoke prevented him from doing so until he was two engine lengths away, when he saw it was at danger. As he could see the line ahead to be clear, he made a steady brake application, not an emergency one, fearing he might otherwise break a coupling. His speed then was about 30 m.p.h. This was corroborated by the fireman, who was firing up the bank and only saw the home signal against them at about 100 yd.

The signalman, a man of 23, in the service seven months as shunter and two as signalman, said he accepted the train when it was offered at 10.29 p.m. and offered it Between 9.30 and 10.0 p.m. he had made two or three trips downstairs to refill his coal bunker, and as the 10.10 p.m. train would be the last before switching out he tested the frame. This included setting the road for the loop and resetting it. Was it possible, he asked, for the points to have stuck in an unclosed position? It was then explained to him that this would have prevented him from locking the points or lowering the home signal.

A senior relief signalman gave evidence of the training the signalman had received. This began on April 4, 1949. On April 6 and again on April 20 he had stayed about 4½ hr. in the box with him, coaching him on the more important points of the rules and block regulations. On April 20 he considered him proficient enough to be examined by the Inspector.

The Inspector thought the signalman to be very good when he examined him and passed him on April 30. He thought it doubtful whether he would know anything about how the interlocking or detection



No	RELEASED BY	LOCKING
16		2. (23. 24 N/R)
17	24	2. 23. 27
18	15. 16. 17	
25	23. 24	(2 N/R) 27

Diagram illustrating circumstances of accident at Douglas Park, May 26, 1949

View of the line from the box is about 180 yd., being restricted by the overbridge, but the track circuit gives warning of a train at 434 yd.

Condition of the Apparatus

After the accident, the railway officers found points 23 set for the main line with bolt inserted for 3 in. Marks on the timbers and sleepers showed quite clearly that the points must have been partially open when the engine reached them and that its wheels took the two stock rails, and dropped between. The left, or main line, switch was probably open about the width of a flange when the first wheel reached it. The lockbar was mid-way, about the top of its travel, and had been forced away from the running edge of the rail. Four clips were broken. It appeared to have been struck in falling towards the unbolted position and the oncoming engine.

All the levers were normal except No. 24, which was in the reversed (points locked) position.

The locking, detection, and so on, were in good order, and Colonel Walker's examination and tests confirmed that. The engine also was in very good order. All this indicated that the points must have been partially open as the engine passed over them and must have been closed for forward. It was accepted by Motherwell Colliery box. The facing points into the loop had been set and bolted for the main line the whole day and so all he did was to clear signals 17, 16, 15 and then 18. At 10.33 p.m. he received "train entering section" and shortly afterwards saw the engine coming under the bridge with sparks flying from its wheels and rocking badly. Realising something was wrong, he restored his signals and sent "obstruction danger." He knew nothing more about the accident and could not account for it. He further stated that he switched the signal box in circuit at 3.30 p.m., when he came on duty, and tested the frame. He then set and bolted points 24 for the main line and had no occasion to touch them again. The loop was not used. Numerous trains passed uneventfully, including the 9.25 p.m. from Glasgow, the last up train before the derailed express. He was at first emphatic that he had not moved the points all day. He said also that no one else was with him and he had not felt sleepy or drowsy. He could not have acted subconsciously and pulled the wrong levers.

After the details of how the equipment worked had been carefully explained to him he admitted that he had just recalled to mind that he had moved the points after the passing of the 9.25 p.m. train. worked, but he would certainly know what to do in case of signal failure of any type. He became a signalman on May 2 and was put in charge of the signal box on that date.

Inspecting Officer's Conclusion

The derailment was caused by the unlocking and movement of the points at the moment when the engine reached them. The signalman must have known how this happened but for some reason, despite all efforts to persuade him, would not divulge it. He maintained that he did not touch the points or f.p.l. levers after lowering his signals for the train and had no idea how the derailment occurred. Colonel Walker regrets that he cannot accept this statement. Physical evidence proved, without reasonable doubt, that the f.p. lock must have been in process of being unbolted when the engine reached the locking bar and the points in mid-position when the engine wheels reached them. The derailment could not have occurred had the points been in the position in which they were found afterwards; they must have been moved under the train as it was coming to a stand and bolted again under it. This was possible because the damaged lockbar had been forced far enough from the rail to escape the wheel flanges, and, moreover, its crippling accounted for the

incomplete insertion of the bolt with the lever fully normal.

Probably the distant signal was replaced behind the train and the home before the driver saw it. Starting and advanced starting were then restored, followed by the lockbar as the leading wheels struck it. A second or two later the points lever was partly pulled as the engine reached the toe of the switch, but was checked when it fell between the stock rails. An attempt to put the lever back was achieved and the points were restored between the bogies of the leading vehicle. It was then found that the lockbar lever could be pulled again and points locked, apparently correctly.

The time taken from when the rear guard's compartment passed the distant signal, seen to be "off" by him, to the engine reaching within 100 yd. of the home signal was at least 40 sec., and tests showed that the operation described could be accomplished in 8 sec.

There are several conceivable explanations, such as testing the frame, attempting to clear point detection, drowsiness, or an unauthorised person in the signal box, but in view of the signalman's persistent denials, little is to be gained by speculation. There is no doubt that the points were moved in front of the train, either by him or with his knowledge, and for this he must be held fully responsible.

A contributory cause may be held to be the driver's failure to stop at the home signal. Although he had reason to believe it would be clear, it was plainly visible from the fireman's side at 1,100 yd. and at 400 yd. from his own. On the rising gradient there would have been no difficulty in stopping had it been seen soon enough from either. It was first sighted by both men at about 100 yd., when an immediate, though not emergency, brake application was made. It was unfortunate that the driver was unable to see the signal sooner but there is no evidence that it would have been at danger if he had. On the contrary, the presumption is that it was restored only a few seconds before the points were unlocked, and probably the driver saw it at once, or soon after.

A full brake application certainly should have been made, but the driver brought the train to a stand in about 230 yd., or 56 yd. only beyond the points, and it is doubtful whether this would have prevented the derailment in any case.

Colonel Walker does not think the driver's judgment should be seriously criticised; he has an excellent record and 50 years' railway service, 37 as driver.

Recommendation

The inquiry disclosed that an unreliable man was in sole charge of an isolated signal box on an important main line, and responsible for a derailment which only good fortune prevented from having more serious consequences. Subsequent discussion with the Regional Officers also disclosed that the earlier railway practice of taking up the references and enquiring into the character of prospective signalmen is no longer followed.

The safety of railway working still depends fundamentally on human factors, and the increasing efficiency of modern signalling and other devices should not be allowed to distract attention from this fact. In signalmen, the quality of reliability is of the highest importance, and in this young man's particular case, seven months as a shunter was evidently not a sufficiently long time to assess his character in this respect. Colonel Walker recommends that consideration be given to the re-introduction of the practice of requiring the references of prospective employees.

Staff & Labour Matters

N.U.R. Wages Claim

The claim for a minimum wage of £5 a week pressed by the N.U.R. on behalf of lower-paid grades has been declined by the Docks & Inland Waterways and the Hotels Executives; the N.U.R. has stated that it is considering further steps to be taken as a result of this rejection. The claim was discussed at a meeting of the Railway Staff Conference and the N.U.R. at Euston on January 24, after which it was stated that a further meeting would be held at an early date, when the considered reply of the Railway Executive would be given. The corresponding claim on behalf of London Transport workers was dealt with by the London Transport Negotiating Committee on January 25.

Railway Shopmen

The railway shopmen's claim, which had been rejected by the R.S.N.C. on November 25, was considered by the employees' side of the R.S.N.C. on January 25; the claim is linked with that of the C.S.E.U. for a £1 a week increase for all its members.

T.U.C. Wages Policy

In his speech at the special conference of union executives on January 12, Mr. J. B. Figgins, General Secretary of the N.U.R., said: "So far as incentives are concerned for the lower-paid workers, the artisan staffs of British Railways, where you would expect incentives to apply, only work under incentives to the extent of 55 per cent. of all artisan staff. To the operative staff it is a quite impracticable proposition, and therefore there is no possibility of workers in the low-paid operative grades getting an increase if they follow the policy recommended by this General Council. Under these circumstances my Executive Committee have decided to reverse their allegiance to the General Council's policy and to ask this conference, in the name of the workers and in the name of the nation, to turn down this report decisively if we are going to march forward on the road that we have followed since 1945."

Iron & Steel Trades Confederation

Mr. Lincoln Evans, General Secretary of the Iron & Steel Trades Confederation and a member of the T.U.C. special economic committee which framed the wages policy, has stated in his union's journal that it is useless for anyone to think that wages restraint can be continued much longer in the face of a rising cost-of-living index, and that it can only be done within a very limited range and period. "Indeed," he says, "if the trade union movement is asked to continue on this course for an indefinite length of time it will rightly cease to have any influence over its members. It is broadly on the understanding that this further restraint would only be required for a period of twelve months that the General Council are prepared to recommend its adoption."

The Iron & Steel Trades Confederation, which offered to suspend its cost-of-living sliding scale agreement in support of the T.U.C. wages policy if the other unions would do the same, has received no support from other unions.

The National Joint Council for the Building Industry has announced an increase of ¼d. an hour, or 1s. 10d. a week, in the standard rates of pay of building workers under a sliding scale agreement related to the retail price index. In other industries, sliding scale increases are due to come into effect as a result of a rise in the index from 112 to 113 in December.

London Transport Staff Redundancy

At the end of December, some 400 men had become redundant at Chiswick bus repair works as the result of completion of a vehicle rehabilitation programme. By co-operation between the London Transport Executive and the unions concerned, the problem has been solved, surplus staff having been accounted for by retirements at age limit, re-arrangement of work, transfer to work of other departments within the Executive, or employment in outside industry.

SABOTAGE ON FRENCH RAILWAYS.—The French railway authorities are keeping a close watch for saboteurs on the lines between Paris and Eastern France as a result of several incidents. It has been established that the recent derailment of a Paris-Strasbourg express was due to a rail loosened by saboteurs. Another accident was averted on January 16 between Thionville and the Saar after a signal had been tampered with so that it indicated that the line was clear. The saboteurs failed to remove fog signals, placed as an additional precaution, and the train was stopped. On the next day, on the same line, fog signals at Hargarten were found to have been made useless. At the Gare de l'Est, Paris, a wooden wedge was found jammed between points.

INTERNATIONAL RAILWAY UNION MEETING.—An agency report from Utrecht states that a meeting of the European International Railway Union, held there on January 16 and 17, agreed to establish a central bureau to deal with technical scientific research relating to railways and general co-ordination. The bureau will be established in Utrecht and will be under the direction of the Netherlands Railways. It was also decided to establish an information centre for European railways, which will be in Rome, and will be directed by the Italian State Railways. This centre will supply the constantly-growing influx of American tourists with improved documentation about the railway systems of Europe. Its task will be to combine and improve the circulation of information about the possibilities and advantages of railways for passenger and goods traffic.

HOLOPHANE DEMONSTRATION ROOM.—The new demonstration room of Holophane Limited, Elverton Street, London, S.W.1, illustrates the principles of scientific light control embodied in the Holophane system, and also its wide range of application. Cabinets built into the wall illustrate the basic principles of vertical and lateral control of light rays as achieved by Holophane prismatic units. Equipment in the ceiling displays different distribution characteristics and specific applications. Fittings exhibited include industrial reflectors, flame-proof, vapour-proof and bulkhead units, floodlighting and street-lighting equipment, commercial pendants, and built-in lighting units, also fluorescent surface and built-in systems. Railway applications of Holophane products comprise lighting equipment in stations, yards, and so on, such as for the Eastern Region Liverpool Street to Shenfield electrification, to which reference was made in our September 30, 1949, issue.

Notes and News

Assistant Engineer (Civil) Required.—The Crown Agents for the Colonies require an assistant engineer (civil) for the design branch of their London office. See Official Notices on page 119.

Signal & Telegraph Shop Foreman Required.—The Sudan Railways require a signal and telegraph shop foreman, between 25 and 35 years of age, for the Sudan. See Official Notices on page 119.

Institute of Transport, Metropolitan Section.—Mr. M. Omerod will read a paper on "The Transport Problems of the East Africa Groundnut Scheme" to the Institute of Transport, Metropolitan Section, on February 6. The meeting will be held at Livingstone House, Broadway, S.W.1, at 5.30 for 6 p.m.

Railway Students' Association.—On February 8, at 6 p.m., Mr. A. B. B. Valentine, Member, London Transport Executive, will read a paper on "The Underlying Principles of the London Plan Working Party's Report" to the Railway Students' Association, London School of Economics & Political Science, Houghton Street, Aldwych.

Portpatrick Branch-Line Services.—As from Monday, February 6, the passenger train service will be withdrawn from the Scottish Region Stranraer-Portpatrick branch-line and passengers for Colfin and Portpatrick will be booked to Stranraer, from which place a motorbus service is available. Portpatrick Station will be closed to all traffic, but Colfin Station will remain open for wagon-load traffic, both freight and passenger train rated. Passenger train parcels and small consignments by freight train for and from Colfin Stations, and all descriptions of traffic for and from Portpatrick, will be collected or delivered in the respective places by road-motor based on Stranraer Station.

Applications for Ordinary Permits.—Members of the Road Haulage Association have been informed that supplies of form P.R.1 to be used for making applications for ordinary permits are available from area offices. Before completing form P.R.1 members are urged to consult their Area Secretary.

New Zealand Railways Orders.—The Birmingham Carriage & Wagon Co. Ltd. has received an order from the New Zealand Government Railways for 125 flat wagons and 80 sheep wagons totalling £204,000 in value. The New Zealand railways have also placed an order with Charles Roberts & Co. Ltd. for 50 insulated wagons valued at about £50,000.

Locomotive Orders for Western Australia.—The Western Australian Government Railways have placed orders in Great Britain for 60 "W" Class 4-8-2 locomotives. This is an increase of 20 on the original order for 40; the new engines will have specially designed boilers. The Administration is also in the market for over 40 main-line diesel-electric locomotives of 950 d.p.h.p. and 18 diesel-mechanical shunters of 300/350 h.p.

British Railways, Southern Region, Lecture & Debating Society.—At a meeting of British Railways, Southern Region, Lecture & Debating Society, on January 11, there was a display of French National Railways films. The films shown were: "A day in the life of an S.N.C.F. engine crew"; "Principles of French railway signalling"; and "Reconstruction of the S.N.C.F., Northern Region, since the war." A commentary in English was superimposed by Mr. R. A. Savill, Honorary Assistant Secretary, and Mr. W. H. Mepsted, Commercial Superintendent, Southern Region, presided over the ensuing discussion.

Anglo-Irish Steamer Strike Settled.—Anglo-Irish cross-channel services, interrupted by a 16-day strike, were resumed on the night of January 24. There was a 5½-hr. conference at Greenore between the three companies and the men's unions.

Increase in French Railway Fares.—As from January 23 all French Railways passenger fares have been increased. The former rates per km. were first class, fr. 6·40; second class, fr. 4·20; and third class, fr. 3. The new rates are fr. 7·50; fr. 5·25; and fr. 4 respectively.

Berlin Railway Services Resumed.—Full services on the Berlin Stadtbahn were restored on January 24. The services had been reduced because of a dispute between the occupying powers over the Soviet-controlled railway directorate building and the alleged damage to railway control installations.

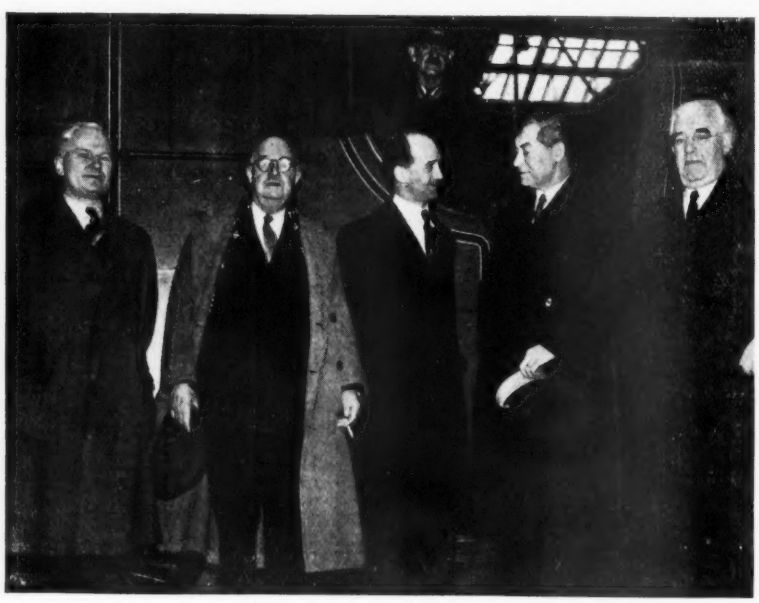
"Trains of Our Times" Poster.—The London Midland Region, Public Relations & Publicity department, has recently produced a fine poster entitled "Trains of Our Times," in which steam, diesel-electric, and electric trains are shown running on parallel tracks at Bushey. The artist, Mr. V. K. Welch, who is a member of the Public Relations & Publicity Staff, has chosen the twin-unit diesel-electric, hauling a set of carriages in the new-livery, as the centre piece of his work.

Motorcar Exports from Southampton.—The Australian Conference, which controls passenger and cargo services to the Commonwealth, has decided to use the port of Southampton for shipment of motorcars. Four shipping companies, P. & O., Orient Line, Shaw Savill, and Port Line will be involved, and there will be four sailings a month, chiefly by chartered ships. Most of the ships will each take about 1,000 motorcars, and the services will operate until the end of the year.

Suspension of India-East Pakistan Traffic.—Through booking of passengers from India to stations in East Bengal (Pakistan) ceased at midnight on January 19. Passengers from either Dominion wishing to travel to the other must buy tickets only to frontier stations and rebook there for their onward journey in the currency of the other Dominion. It is stated that the Pakistan Government has informed the Indian Government that no goods traffic will be accepted from Assam to Calcutta unless India will deposit a sum with the State Bank of Pakistan. Already 1,000 wagons destined for places in India are held up in East Bengal.

Docks Executive Visit to Clyde.—Sir Reginald Hill, Chairman, and Sir Robert Letch, Mr. John Donovan, and Sir Hector McNeill, Members, of the Docks & Inland Waterways Executive, are commencing a visit to Glasgow and the Clyde area on February 6. In December, 1948, the Executive conducted a review of Clyde area trade harbours and subsequently the British Transport Commission decided that a scheme of unification should be prepared. The present visit of the Executive is in accordance with Sec-

Mr. J. H. Brebner at Amiens Street Station, Dublin



A group including Mr. J. H. Brebner, Chief Public Relations & Publicity Officer, British Transport Commission, who has recently been in Ireland, taken at Amiens Street Station, Dublin, Great Northern Railway (Ireland)

Left to right: Messrs. T. Carton, District Superintendent, Dublin, G.N.R. (I.); F. S. Veltom, Traffic Manager for Ireland, Western Region, British Railways; L. A. Luke, Public Relations Officer, Coras Iompair Eireann; J. H. Brebner; A. J. Broughton, Irish Traffic Manager, London Midland Region, British Railways

Photo] [*The Irish Times*

OFFICIAL NOTICES

None of the vacancies on this page relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he, or she, is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

WANTED: Good Secondhand Turntables, standard gauge, suitable for ordinary 20-ton wagons.—Reply Box 586, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LONDON Firm of Engineers and Agents with 30 years' experience of handling Contracts with leading Railway Authorities and Consulting Engineers would welcome two additional agencies for reputable manufacturers of Railway specialities who need an efficient London Office.—Box 607, c/o *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

MECHANICAL APPLIANCES FOR HANDLING RAILWAY TRAFFIC. By G. Bulkeley. An explanation of the employment of mechanical apparatus for handling and carting general goods traffic. 7½ in. by 5 in. 132 pp. Illustrated. 5s. By post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

TRAFFIC CONTROL ON THE L.M.S.R. Co-ordination of operating arrangements as a result of grouping.—Central, Divisional, and District Control—Outline of unified methods adopted—Organisation and working—Control telephone circuits—Daily telephonic conferences. Paper. 12 in. by 9 in. 20 pp. Illustrated. 5s. By post 5s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

Crown Agents for the Colonies

ASSISTANT ENGINEER (CIVIL) required for the Design Branch of the London Office. Salary scale, £475 a year rising to £750 a year. The £475 minimum is linked to entry age of 25 with the addition of £25 for each year above that age, up to £600 and the subtraction of £25 for each year below that age. Extra duty allowance of 8 per cent. of annual salary also payable at present. Engagement will be on unestablished terms with a prospect, after satisfactory service of appointment to the established and pensionable staff in due course, vacancies permitting. Candidates, not over 30 years, must be Corporate Members of the Institution of Civil Engineers, or have passed the qualifying examination of this Institution or hold an exempting degree or have obtained the Testamur of the Institution of Municipal Engineers. They must have had experience in the office, of a Civil Engineer, the Civil Engineering Department of a railway, a firm of Structural Engineers, the Civil Engineering Branch of a Municipality or a Contractor, and should be capable of preparing designs for bridge and buildings in steel and have knowledge of re-inforced concrete design. Some experience in the field or on works desirable. Duties will entail designs for steel and re-inforced concrete structures and general Civil Engineering work. The officer may be required to undertake short tours in the Colonies on field or survey work. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/24958/3A on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

Sudan Government

THE Sudan Railways require a Signal and Telegraph Shop Foreman, aged 25 to 35 years of age for service in the Sudan. The duties consist of the supervision of repairs of apparatus in the Signal and Telegraph Workshop and the instruction of Sudanese Staff in the Signal and Telegraph work. Candidates must have had workshop experience in the repair of mechanical signal apparatus, telegraph apparatus, Traffic Control Telephones and Tablet and Token Instruments. They should be capable of supervising the erection and locking of lever frames up to 50 levers, be able to prepare diagrams, interlocking tablets and working charts. Preference will be given to candidates who have had outdoor experience in the installation and maintenance of signal and telegraph apparatus. Appointment will be on Short Term Contract for five years on a salary between £E.450 to £E.600 per annum, with post-service benefits. Cost of Living Allowance varying between £E.180 and £E.390 per annum according to the number of dependents is at present payable, and, subject to certain limitations an Outfit Allowance of £E.40 is payable on appointment. There is at present NO INCOME TAX in the Sudan. Free passage on appointment. Full particulars and application form may be obtained on application to: Sudan Agent in London, Wellington House, Buckingham Gate, London, S.W.1. Please mark envelopes "Signal Foreman."

ENGINEERING OFFICE having good connections with purchasing offices, consulting engineers and overseas Governments in London, desires further representations of first class manufacturers of railway specialities.—Box 588, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

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tion 66 of the Transport Act, 1947, which provides that a scheme may be prepared in consultation with the harbour authorities, shipping and traders' representatives, and workers concerned. Members of the Executive will meet the parties concerned in Ayr and Troon on February 6, in Ardrossan on February 7, in Glasgow on February 8 and 9 and in Greenock on February 10.

B.E.S.T.E.C. Display at Canadian Trade Fair.—The exhibit of the British Engineers Small Tools & Equipment Co. Ltd. will be one of the largest at the Canadian International Trade Fair to be held at Toronto, referred to in our January 13 issue. Totalling 2,880 sq. ft., it will show North American buyers a large selection of high-precision equipment manufactured by the fifteen B.E.S.T.E.C. member companies. The stand will be under the supervision of the B.E.S.T.E.C. Canadian Division, which will celebrate its first anniversary during the course of the exhibition.

Lectures on Incentive.—A series of ten weekly lectures, five on incentives affecting a public organisation as a whole, and four on incentives affecting the individual worker, has been arranged by the Institute of Administration. Speakers include Mr. John Benstead, Deputy-Chairman of the British Transport Commission, who will lecture on March 15 on "Fostering the Team Spirit." The first lecture was given on January 25, by Mr. Ernest Davies, M.P., on "Public Accountability," and the remainder will be given on alternate Wednesdays at 6.15 p.m. at the Hotel Victoria, Northumberland Avenue, London, W.C.2. Tickets may be obtained from the Institute of Administration, 18, Ashley Place, London, S.W.1.

Engineering Equipment Users Association.—Five companies in the process industry field, namely, the Anglo-Iranian Oil Co. Ltd., Courtaulds Limited, Imperial Chemical Industries Limited, Lever Bros. & Unilever Limited and Shell Petroleum Co. Ltd., have formed an association, entitled the Engineering Equipment Users Association. This organisation will provide its members with a means for exchanging information on standardisation of engineering materials and equipment. It will work through the British Standards Institution on matters of general standardisation, and will assist that Institution by presenting, as far as possible, the co-ordinated views of its members' representatives who serve on B.S.I. technical committees and other bodies. The Association hopes that, when experience has been gained, arrangements may be made for other user firms to take part in consultations. Brigadier L. F. S. Dawes, late Royal Engineers, has been appointed Secretary, and the offices are at 20, Grosvenor Gardens, London, S.W.1.

Productivity in the Steel Industry.—Sir Peter Bennett, a member of the Anglo-American Council on Productivity, told the Institute of Industrial Supervisors on January 20 that as the result of studying the report issued last September of the iron and steel team which visited the U.S.A., productivity in two steel foundries had increased by 7 to 8 per cent. It was thought it could be increased by as much as 25 per cent.

Red & White United Transport Co. Ltd.—On February 7 the shareholders of the Red & White United Transport Co. Ltd. will be asked to ratify an agreement handing over to the State ten of their bus companies operating over twelve counties. The biggest company is the Red & White Services Limited which covers a large area of South Wales and the Border counties. The group has a share capital of more than £800,000 in £1 shares. If the agreement is ratified the company will retain its interests in many other companies including manufacturing firms. It will also develop public transport in the Commonwealth and already controls ten subsidiary companies in East Africa.

British Railways Order Motorcar Carrier.—The Railway Executive is to augment its fleet by the construction of a vessel intended primarily to provide for the rapidly increasing traffic in private cars by the Dover-Calais and Folkestone-Boulogne routes. This ship, for which an order has been placed with William Denny & Bros. Ltd., Dumbarton, is designed to carry about 126 cars, which it will be possible to handle either by crane or by direct end-on loading. The vessel will be driven by steam-turbines fed by two water-tube boilers using oil fuel, and will have a speed of 20 knots. To provide for motorists accompanying their cars, the new vessel will be capable of carrying up to 700 passengers, and will have the usual range of public rooms, restaurant, buffet, and private cabins.

English Electric Issue Oversubscribed.—The offer by The English Electric Co. Ltd. of £3 million of 4 per cent. debenture stock, which we referred to on page 83 last week, was heavily oversubscribed when the lists opened on January 24.

Road Accidents in November, 1949.—The return issued by the Ministry of Transport of the number of persons reported to have died, or to have been injured, as a result of road accidents in Great Britain, during the month of November last shows 473 deaths (compared with 412 in November, 1948), 3,688 seriously injured (compared with 2,903 in November, 1948), and 10,622 slightly injured (compared with 10,226).

Stewarts and Lloyds Minerals Limited.—As from January 1, mineral properties of Stewarts and Lloyds Limited, the Stanton Ironworks Co. Ltd., and other subsidiary firms, together with land associated therewith, have been transferred to Stewarts and Lloyds Minerals Limited and will in future be owned and operated by this company. The Chairman is Mr. J. R. Menzies-Wilson. The company owns 14,000 acres and controls 66,000 acres of ironstone bearing land in the Midlands, and its annual production of ironstone is about 4½ million tons, out of the total home ore production of approximately 13 million tons.

Eight Trains Trapped in Snowdrifts.—A report from Vancouver states that eight transcontinental freight and passenger trains have been imprisoned in Fraser Canyon, 100 miles east of Vancouver, since January 19 by snowdrifts. More than 100 passengers have been stranded, and further storms have delayed the clearing of

the tracks. Westbound trains are now stopping at Kamloops, or Calgary, whence passengers are taken to Vancouver by air. In 17 flights over the weekend, aircraft brought more than 500 passengers and took passengers to Calgary to board the eastbound trains. The power services in Fraser Valley towns closer to Vancouver are still disrupted, but are gradually returning to normal in the milder weather.

Ulster Transport Authority Regulations.—The Ministry of Commerce for Northern Ireland, on January 21, announced the making of regulations entitled the Ulster Transport Authority (terms and conditions of employment) (Northern Ireland) Regulations, 1949. These provide for the establishment of machinery for the settlement by negotiation of terms and conditions of employment of certain grades of workers employed by the Authority, and, in default of such settlement, for reference of certain matters to a Transport Staff Tribunal. The regulations also provide for the establishment of local departmental committees and sectional councils to promote and encourage measures affecting the welfare of workers and to discuss matters of common interest.

Forthcoming Meetings

January 27 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, at 5.30 p.m. Discussion on "Some Factors in the Use of High Temperatures in Gas Turbines," by Mr. T. W. F. Brown.

January 28 (*Sat.*).—Permanent Way Institution. Annual winter dinner, at the Railway Executive, 222, Marylebone Road, London, N.W.1, at 5.45 for 6.15 p.m.

January 28 (*Sat.*).—British Railways, Southern Region, Lecture & Debating Society. Visit to Kingston on-Thames power station.

January 31 (*Tue.*).—Institution of Electrical Engineers, Savoy Place, London, W.C.2 at 5.30 p.m. Discussion: "Metering of Welding Loads," opened by Mr. G. F. Shotter.

February 2 (*Thu.*).—British Railway, Western Region, London Lecture & Debating Society, in the Clerks' Dining Club, Bishop's Bridge Road, Paddington, at 5.45 p.m. Debate with Oxford University Railway Society: "That a more efficient and economical system of transport in this country could be secured by the abolition of railways and the conversion of their tracks to motorways."

February 2 (*Thu.*).—Institution of Electrical Engineers, Savoy, Place, London, W.C.2, at 5.30 p.m. "Fault-Throwing Tests on the 132-kV. Grid System under Normal Working Conditions," by Messrs. W. Casson and F. H. Birch.

February 3 (*Fri.*).—Institution of Railway Signal Engineers, at the London Transport Executive Signal School, Earls Court Station, at 6.15 p.m. "Block Instruments," by Mr. J. H. Currey.

February 3 (*Fri.*).—Institute of Transport, North Staffordshire Group, at the North Stafford Hotel, Stoke, at 6.30 p.m. "Public Relations in Transport," by Mr. R. M. Baschy.

February 3 (*Fri.*).—Railway Club, 57, Fetter Lane, London, E.C.4, at 7 p.m. Annual general meeting, followed by "In *re* Kent: Watkin *versus* Forbes," by Mr. Kenneth Brown.

Railway Stock Market

Markets have again showed caution in all sections owing to election uncertainties. The only exception was British Funds, which scored an all-round rise, led by long-dated stocks. British Funds were favoured on the view that, whatever the outcome of the election, they are the one section of markets likely to rally. Buying has not been pronounced, but prices responded readily, largely because there was little selling; and gains in long-dated stocks ranged up to £1. Consols and Treasury 2½ per cents. were up to 70 and 69 respectively, while 3 per cent. Transport (1978-88) rose to 89. The up-trend in Gilt-edged had little effect on other sections of markets, apart from helping a firmer undertone in leading industrials. The nationalisation threat caused sharp losses in cement shares, Associated Cement falling to 72s. 6d., while Industrial Assurances were marked down sharply, with little selling.

With markets inactive, foreign rails were less prominent and profit-taking has been in evidence in La Guaira and Bolivar stocks since their recent activity and strength. Current prices are generally well below the likely pay-out terms on the basis of the directors' estimates. The latter are on the assumption that the acquisition terms resulting from the negotiations will be in line with expectations. La Guaira receded to 75 and the 5 per cent. debentures were 88. Bolivar 5 per cent. "A" debentures were 85 and "C" debentures 56. Fears of some months' delay before Brazil finally ratifies the sale agreement led to further selling of Leopoldina; the ordinary eased to 8½, the preference to 25¼, while the 4 per cent. and 6½ per cent. debentures were 89 and 123 respectively. Leopoldina 5 per cent. debentures also came back sharply to 93; the ordinary shares kept around 2s. 6d. Great Western of Brazil were 133s.

Manila "A" debentures changed hands around 76 and the 5 per cent. preference were 6s. 6d. United of Havana 1906 debentures eased to 25½; Antofagasta firmed up to 8¼ and the preference stock was 46½. Canadian Pacifics have been uncertain with dollar stocks generally, and eased to 27¼. Nitrate Rails were quoted at 75s. Dorada Railway ordinary stock, which is firmly held and does not frequently change hands, showed some dealings around 73. Guayaquil & Quito 5 per cent. first bonds marked 26, and Chilean Northern 5 per cent. first debentures were dealt in up to 29⅜.

Road transport and bus shares have held steady in most cases, on the view that dividends are likely to be maintained, although owing to rising costs, profits for 1949 will be below the high levels of 1948. If there is a change of Government, it is now generally taken for granted that there will be no further acquisitions of bus companies by the B.T.C. West Riding have been firm at 66s. with Southdown again at 125s., Lancashire Transport 82s 6d., Maidstone & District 91s. 6d., but B.E.T. deferred stock was at one time down to 440.

There was again little business in the iron and steel section, largely because buyers are showing great caution until the election is over. Nevertheless, iron and steel shares offer good yields with good prospects of maintaining dividends for the current year, even allowing for the probability that, owing to rising costs, net profits will show some contraction despite expectations of further record steel production this year. In the event of nationalisation, iron and steel shares would probably go nearer their scheduled take-over levels. They would in fact then become a medium term option on British Funds, because British Steel stock, into which iron and steel shares would be transferred in 1951, would have to be issued on terms in keeping with the general position then obtaining in the gilt-edged market. United Steel have eased to 26s. 3d., Dorman Long to 31s., but Hadfields have been steady at 26s. 9d., and Thomas & Baldwins strengthened to 13s 9d.

In locomotive builders' and engineers' shares, sentiment was affected by talk of growing competition from Germany in export markets. Nevertheless, share prices in general have been fairly well maintained. Vulcans were 18s. 6d., Beyer Peacock 19s 3d., North British 19s. 7½d., Wagon Repairs 16s. 6d., and T. W. Ward 56s. Gloucester Wagon moved lower at 48s. 9d., but Birmingham Wagon have been steady at 28s. 9d. Charles Roberts were 83s. 9d., North Central Wagon 12s. 6d., Central Wagons 88s. 9d. and Hurst Nelson 59s. 3d.

Traffic Table of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1947/48	No. of week	Aggregate traffics to date: Total 1948/49	Aggregate traffics to date: Increase or decrease
				£	£		£	£
South & Central America	Antofagasta... ...	811	15.1.50	87,460	+ 23,290	2	148,784	+ 5,460
	Costa Rica	281	Nov., 1949	c908,612	– c111,761	22	c4,798,079	– c300,357
	Dorada	70	Nov., 1949	23,909	– 8,758	48	320,787	+ 14,879
	Inter. Ctl. Amer. ...	794	Nov., 1949	$1,024,981	– $69,512	48	$11,135,106	– $1,030,145
	La Guaira	22¾	Dec., 1949	$95,154	– $20,009	52	$1,262,514	– $11,002
	Nitrate	382	15.1.50	21,227	+ 6,162	2	21,227	+ 6,162
	Paraguay Cent. ...	274	6.1.50	£132,335	+ £38,747	27	£3,867,462	+ £1,068,778
	Peru Corp.	1,050	Dec., 1949	$6,786,200	+ $2,633,399	26	$33,795,958	+ $11,248,527
	" (Bolivian Section)	66	Dec., 1949	Bs.10,712,000	+ Bs.2,677,768	22	Bs.62,869,164	+ Bs.10,973,057
	Salvador	100	Oct., 1949	c68,000	– c14,000	17	c313,000	– c16,000
	Taltal	154	Dec., 1949	14,725	+ 5,825	26	75,705	+ 28,285
	United of Havana ...	1,301	11.6.49	$231,311	+ $14,746	49	$13,733,928	– $4,659,951
Canada	Canadian National†	23,473	Nov., 1949	14,853,000	+ 84,000	48	151,818,000	+ 3,068,000
	Canadian Pacific† ...	17,037	Nov. 1949	10,723,000	– 655,000	48	111,045,000	+ 2,988,000
Various	Barsi Light* ...	167	Dec., 1949	28,928	+ 4,425	39	267,533	+ 19,875
	Egyptian Delta ...	607	31.10.49	21,874	– 5,055	31	385,264	– 12,682
	Gold Coast ...	536	Oct., 1949	217,578	– 497	32	1,625,728	+ 213,529
	Mid. of W. Australia	277	Nov., 1949	31,973	+ 1,942	22	141,839	– 1,905
	Nigeria	1,900	Oct., 1949	632,907	+ 115,113	30	3,360,709	+ 216,792
	South Africa ...	13,347	24.12.49	1,487,951	+ 92,503	38	57,163,148	+ 5,179,797
	Victoria	4,744	Oct., 1949	1,792,078	+ 371,156	17	—	—

* Receipts are calculated @ 1s. 6d. to the rupee † Calculated at $3 to £1